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THE HISTORY OF THE MODERN PUBLIC HEALTH MOVEMENT

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The modern public health movement is deeply rooted in its historical background, and a full appreciation of its significance is dependent upon a knowledge of its history. For this reason, any treatise dealing with the general subject of public health must of necessity entail an account of its historical evolution. The status of public health practice, today as in the past, is dynamic rather than static. Indeed, the story of the development of public health is a most interesting one, and it may be safely said that the last chapter is yet to be written. It is the intention of the narrator to review briefly the high lights of this fascinating story.

THE ORIGINS OF PUBLIC HEALTH

In order to obtain a clear cut perspective of present day public health practice, we must retrace our steps all the way back to Biblical, Ancient, and Medieval times, where we encounter its origins. Winslow[1] refers to this period as the Dark Ages of Public Health.

During Biblical times the Mosaic Law prescribed certain public health measures in the fields of personal hygiene and environmental sanitation for the benefit of the Hebrews. According to the Old Testament (Leviticus) the Jews had some appreciation of the importance of the contagious nature of certain diseases for here we find certain principles of isolation and quarantine clearly enunciated. For instance, the lepers were required to wear the so-called Lazarus bell in order to warn passersby of their presence.

We may now pass on to an account of public health practice in Ancient Greece. At that time emphasis was placed upon personal hygiene. All boys were required to take physical exercises regularly and the principle of a sound mind in a sound body was propounded. Other personal hygiene activities included: care of the skin by washing and bathing, swimming, massage, physical cleanliness, proper diet, rest, and regulation of the sexual life.

In Ancient Rome, the development of environmental sanitation reached a high point of effectiveness. Among the public health activities of this period may be mentioned the following: Installation and maintenance of a sanitary system of sewerage, street cleaning, abatement of nuisances such as disposal of dead animals and other decaying organic matter, destruction of spoiled foods, supervision of baths, taverns, and houses of prostitution, and, finally, the prevention of water pollution.

The public health practices of the Dark Ages, namely, the development of personal hygiene in Ancient Greece, of public sanitation in Ancient Rome, and the practice of isolation and quarantine in Biblical times, may be considered as the forerunners of the modern public health movement.[1]

Unfortunately, progress in public health did not continue uninterruptedly; as a matter of fact, it received quite a set-back in the Middle Ages when the practice of Asceticism and Monasticism prevailed. It was not until the eighteenth century that any public health measure of any consequence was put into effect. That was the practice

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of inoculation against smallpox. In 1798 Edward Jenner announced his discovery of vaccination. At the London Smallpox Hospital, over 3000 persons were inoculated over a two year period, as this disease prevailed in epidemic form at that time.

THE THREE ERAS OF THE MODERN PUBLIC HEALTH MOVEMENT

For all practical purposes, the evolution of the modern public health movement may be divided into three fairly distinct eras, namely: First era: 1850—1870; second era, 1870—1915-20; third era, 1920—present.

According to Winslow,[1] the modern public health movement began with the advent of sanitary knowledge in 1850. The scientific spirit and humanitarian principles were the two factors responsible for the birth of the movement.[1]

However, as far back as the eighteenth century, progress in the field of sanitation received a tremendous impetus by the campaign for prison reform under the direction of John Howard in England. He made a sanitary survey of the prisons and found them in the most appalling condition. Many of them lacked a water supply, adequate ventilation, and a proper excreta disposal system. The incidence of typhus fever was excessively high. As a result of this survey, many corrections of insanitary conditions were made.

The next great step forward in the progress of sanitation occurred in 1785 in connection with the campaign for the protection of the industrial workers of England. As a result, the so-called English Poor Laws were enacted, which provided for widespread improvement of sanitary conditions as well as the control of contagious diseases in industrial groups.

In this connection, the work of two other great English sanitarians must be mentioned, namely, Sir Edwin Chadwick and Sir John Simon. Chadwick was a lawyer and sociologist, and served in the capacity of Secretary of the Poor Law Commission. He was responsible for a survey of sanitary and health conditions in England, which was carried out by physicians. The point of major interest was the relationship between filth, poverty, and epidemic diseases. He published the results of his work in a volume entitled: "Sanitary Conditions of Great Britain." In 1848 the General Board of Health was organized and its membership included Chadwick. This Body initiated the movement for a safe water supply and sanitary disposal of sewage.

Simon served as Medical Officer of London for seven years and later on as Central Medical Officer to the General Board of Health. He was responsible for the enactment of valuable public health legislation, especially the so-called Sanitary Act of 1866 which "gave powers to local authorities to suppress all kinds of nuisances and to provide all such works and establishments as the public health primarily requires."

FIRST ERA OF THE MODERN PUBLIC HEALTH MOVEMENT (1850-1870)

We shall now turn our attention to the development of public health in the United States. Very little progress was made during the period extending from 1800 to 1850. Winslow[1] states that the movement began in this country in 1850 with the advent of the publication of Lemuel Stattuck's "Report of the Massachusetts Sanitary Commission." Shattuck was not a physician, but a statistician and sociologist; notwithstanding, he had a keen appreciation of the public health problems of that period. Epidemics of smallpox, yellow fever and typhus ravaged the land at that time. The tuberculosis mortality rate for Massachusetts numbered 300 per 100,000 population. The public health activities included the abatement of nuisances, prevention of overcrowding, street cleaning, regulation of slaughter houses, public baths and pig sties.[2] Following are some of Shattuck's outstanding recommendations:[1] Establishment of a system of sanitary police with state and local health departments, careful collection and analysis of vital statistics, sanitation of towns and buildings, school hygiene programs, special investigation of tuberculosis, supervision of mental disease by boards of health, establishment of nurses training schools, teaching of sanitary sci-

ence in medical schools, the establishment of competent local boards of health, education of the public in health matters, routine physical examinations, and the keeping of family records of illness.

Shattuck was indeed a visionary individual and as a result of his investigations, the first State Board of Health was established in Massachusetts in 1869. In 1864 a great step forward was made in the field of municipal health practice when Dr. Stephen Smith made a thorough survey of sanitary conditions in New York City. This was reported in a very interesting manner in his book entitled, "The City That Was."[3] Political interference in the administration of the health program prevailed at that time, and an exposé of the existing insanitary conditions led directly to the enactment of the Metropolitan Health Law, authorizing the following reforms:[2] (1) Underdrainage of the soil; (2) removal of cellar populations to homes in open air and sunlight; (3) removal of offensive industries; (4) enforcement of rigid sanitary regulations.

During this period, knowledge regarding the causation of contagious diseases was very meager indeed. Many superstitions as well as erroneous ideas prevailed. It was believed, for instance, that diseases were caused by evil spirits, bad odors, the influence of the moon and stars, and the so-called "evil-eye." The miasmatic theory of disease was in vogue; that is, the belief that gases, odors and stenches resulting from decomposed organic matter were responsible for the transmission of many contagious diseases. For example, marsh gas was credited with being the cause of diphtheria; malaria was associated with bad air from the swamps. Sewer gas was credited with being the cause of a number of diseases, notably diphtheria. Mental diseases had some connection with the influence of the moon and stars.

We may say that the abatement of nuisances constituted the chief public health activity of the first era of the modern public health movement, and the personnel consisted of solely the untrained police sanitary inspector.

SECOND ERA OF THE MODERN PUBLIC HEALTH MOVEMENT (1870-1920)

Up to this time, the control of epidemic diseases was not based on scientific facts, but the second chapter in the story of the history of public health changed the situation radically. This era was characterized by the great scientific discoveries of fundamental importance to modern public health practice and is generally referred to as the "Golden Age of Bacteriology." Koch and Pasteur may be singled out as the great personalities of this epoch, whose monumental contributions revolutionized the practice of public health.

The work of Pasteur is undoubtedly familiar to public health workers. He was the first to promulgate new ideas on contagion, and was responsible for the acceptance of the germ theory of disease. His early studies on the process of fermentation was due to the action of microbes, thus disproving the theory of spontaneous generations. In 1877 Pasteur demonstrated the etiology of anthrax. In 1881 Pasteur with Sternberg described the pneumococcus.

The principle of vaccination was one of Pasteur's outstanding contributions to public health knowledge. Although vaccination against smallpox had long been practiced before Pasteur's time, as we already know, no one really explained the underlying mechanism of action until he cleared up the mystery. He showed that the germs causing contagious diseases can be attenuated and that in overcoming these weakened germs, the body gains protection against the virulent ones. The Pasteur treatment for rabies is a practical application of this principle.

Robert Koch's name has been immortalized by virtue of his discovery of the tubercle bacillus in 1882. Another outstanding achievement credited to Koch is the discovery of tuberculin. Koch's postulates will go down in the annals of public health history as one of the greatest advances in bacteriology. In 1883 Koch discovered the cholera bacillus.

Among the other advances in bacteriology and parasitology of this period may be listed the following:[4]

1. Lister's application of the germ theory to antisepsis in surgery.

2. The work of Holmes and Semmelweis on the prevention of puerperal sepsis.

3. Discovery of the relationship of cholera to a contaminated water supply by Snow of London (1854).

4. The nature and mode of transmission of typhoid fever by William Budd.

5. Losch in 1875 ascribed tropical dysentery to an ameba.

6. In 1874 Ehrlich developed the aniline dyes for staining bacteria.

7. In 1879 Neisser found the gonococcus.

8. In 1884 Gaffky discovered the typhoid bacillus.

9. In 1884 Klebs-Loeffler discovered the diphtheria bacillus.

10. In 1888 von Behring discovered diphtheria antitoxin.

11. In 1894 the discovery of the germ of bubonic plague by Yersin.

12. In 1898 Grassi and Bignami identified the microbe of human malaria in the anopheles mosquito.

13. Ronald Ross discovered the vector of malaria.

14. Laveran found the malaria organism in patients.

15. Discovery of the mosquito as intermediary agent in the transmission of yellow fever by Agramonte, Lazear, and Findlay.

16. Schaudinn and Hoffmann discovered the *Treponema pallidum* in 1905.

17. In 1906 Wassermann discovered the complement fixation and perfected the Wassermann reaction.

18. The indictment of the body louse as the cause of typhus by Nicolle and his associates (1909).

The natural sequelae of the idea of germs causing contagious diseases was the practice of quarantine, isolation, and fumigation.[5] Since these diseases were spread by direct personal contact and indirectly by articles freshly soiled with discharges containing the source of the infection, then such measures should be 100 per cent effective in checking the spread of the infection, according to the authorities at that time. Accordingly, "shot-gun quarantine" was widely practiced and "pest houses" were in vogue. Quarantine stations for the examination of ship passengers and crews were usually built many miles away from ports.

In 1910 Charles Chapin wrote a treatise entitled, "The Sources and Modes of Infection," which was considered a landmark in the history of public health in America. He deprecated the value of terminal fumigation and recommended the following measures to be employed in the control of communicable diseases: (1) Search for carriers; (2) quarantine of contacts; (3) prompt isolation of early cases.

In the second era, environmental sanitation became second in importance to communicable disease control.[2] In 1892 W. H. Park of New York City introduced the new technic for the bacteriologic diagnosis of diphtheria. In 1895 the examination of the sputum of tuberculosis suspects became routine and tuberculosis was recognized as a communicable disease. Diphtheria antitoxin was put on the market in 1894.

In 1908 Evans introduced compulsory pasteurization of milk in Chicago. The first effective filter for purification of water was constructed for Lowell, Massachusetts in 1893.

The public health achievements of the second era were accomplished primarily in the fields of sanitary science and sanitary engineering and the control of communicable diseases was the chief activity of the health department. The personnel consisted of the laboratory worker trained in bacteriology and chemistry, and the more specialized sanitary officer. They were responsible for blocking the routes over which contagious diseases travel, such as a contaminated water and milk supply, insect carriers of disease producing germs, contaminated food supplies, and finally, social contact routes. The public health measures in effect were based on scientific facts. As a result, the mortality rates of the following contagious diseases dropped to a record low: tuberculosis, malaria, diphtheria, and smallpox.

THIRD ERA OF THE MODERN PUBLIC HEALTH MOVEMENT (1920-PRESENT)

We come now to the third era which takes us up to the present time. This chapter in the history of preventive medicine is characterized chiefly by the shift of public health interest from the environment to the individual. Emphasis was placed on positive health and physical fitness; that is, the improvement of the health of the individual.

The results of the draft physical examinations during World War I, and the excessively high tuberculosis mortality rate jointly precipitated the movement for individual health protection and promotion. Three and one-half million young men were examined and the results were appalling. One-third of these men had so many serious physical defects that they could not be used for first line duty.

The tuberculosis mortality rate at that time was seven times higher than it is today. Periodic physical examinations of all adults by the family physician were urged and the early prevention and correction of any physical defects discovered. As a result, additional personnel had to be called in, in order to carry on these newer activities. The services of doctors, nurses, and dentists were required.

THE DEVELOPMENT OF COUNTY HEALTH ORGANIZATIONS

A treatise on the history of the modern public health movement would not be complete if it did not incorporate a brief account of the development of county health organizations in the United States. A realization that public health service should be available to rural as well as urban populations was responsible, in a large measure, for the development of the county health movement. The county health movement of the past quarter of a century may be said to be the outstanding public health development in the United States from the standpoint of rural population.[6]

Two public health programs have stimulated the growth of the county health movement in this country, namely:[6] (1) The typhoid fever program of the United States Public Health Service, under the direction of L. L. Lumsden (1911); (2) the hookworm disease program in the South, of the Rockefeller Foundation, under the direction of Wickliffe Rose (1910-33).

During the period extending from 1890 to 1910, the typhoid mortality rate was excessively high, so that the control of this disease was a major public health problem. Sanitation was soon recognized as the most effective public health measure available in the control of this disease. In 1911, L. L. Lumsden, of the United States Public Health Service, was assigned the task of studying a typhoid epidemic which ravaged Yakima County, Washington. The typhoid mortality rate for this county at that particular time was 200 per 100,000 population (over five times that for the United States average), and it was decided that the incriminating agent was the prevailing insanitary conditions. Accordingly, an extensive campaign was carried on to correct these conditions, and it proved to be most effective in reducing both the morbidity and mortality rates for this disease. In order to provide continuous public health service, Lumsden recommended the establishment of a county health department and this was effected in 1911. Yakima County, Washington, claims the distinction of having the oldest county health department in the United States, but Jefferson County, Kentucky, and Guilford County, North Carolina also claim priority.

Through funds provided by John D. Rockefeller in 1910, a program for the study and control of hookworm in the South was undertaken. The Rockefeller Sanitary Commission under the direction of Wickliffe Rose was organized and took over the responsibility of administering this program. It extended over a five year period, the work being carried on in cooperation with the State Health Department. The first half of the campaign was devoted to the education of the medical profession and the public regarding the importance, prevalence, distribution, diagnosis, and treatment of hookworm disease. The latter half stressed sanitation and the establishment of county health departments by providing financial assistance.

The conclusion drawn from these studies and experiences was that only full time county health units could adequately provide health services and meet the individual needs of rural areas.

The growth of county health organizations has been very rapid; in 1918 there were 30 county health units in the United States operating on a full time basis, while in 1935 the number had increased to 762, and in 1940 to 1,577.

NEW PUBLIC HEALTH PROGRAMS OF THE THIRD ERA

The programs of the activities of present day health departments include the following: tuberculosis control, venereal disease control, communicable disease control, vital statistics, laboratory services, maternal-child hygiene, services for crippled children, school hygiene, adult hygiene, public health nursing, public health nutrition, public health dentistry, public health education, industrial hygiene, mental hygiene, cancer control, pneumonia control, housing, accident prevention, general sanitation, and sanitary engineering. A brief account of the development of some of the newer programs of major importance follows.

TUBERCULOSIS CONTROL

The first great step forward in tuberculosis control was the sanatorium movement initiated by Trudeau in 1885. Home nursing care for the tuberculous was originated by Osler in Baltimore in 1899. The first Society for the Prevention of Tuberculosis was organized by Flick in Philadelphia in 1892. Herman Biggs, a former New York State Health Commissioner, first inaugurated a well rounded public health program for the control of tuberculosis. Quoting from Winslow:[1] "It involved as fundamental the compulsory reporting of cases, the provision of laboratory facilities for diagnosis and a system of medical inspection, cleansing, and disinfection. It provided for an educational campaign through the use of specially prepared circulars of information and also the utilization of the public press and lectures for the dissemination of popular literature."

The National Tuberculosis Association was organized in the early part of the twentieth century and dedicated itself to the task of reducing the prevailing excessively high tuberculosis mortality rate. At the thirty-sixth annual meeting of the National Tuberculosis Association (1940), Chadwick,[7] in his presidential address, took as his subject, "The Subjugation of Tuberculosis." Quoting from this address: "One of the great achievements of the twentieth century will be the subjugation of tuberculosis. We are far enough along in the campaign that started when the National Tuberculosis Association was organized thirty-six years ago to be quite certain that eventually victory will be won. In the early days of the Association, the stress was put upon treatment, later on prevention, then on health education and on case-finding — these together with research make up the forces that under one coordinated command are now in the field doing valiant work against the disease. The death rate has dropped 76 per cent in forty years."

The present day activities in the fight against tuberculosis include the following: case finding, isolation of open cases, prompt and adequate treatment, follow-up and rehabilitation, and public health education.[8] Among the new tools for case-finding are the 4 x 5 inch and the 35 mm. miniature films used in mass surveys.[9, 10] They are photographs of the fluoroscopic image of the chest and are preferable to the usual 14 x 17 inch films because of economy.

VENEREAL DISEASE CONTROL

The campaign for the control of venereal diseases had its beginning in France under the influence of Fournier in 1900 when the French Society of Sanitary and Moral Prophylaxis was established. In this country, the guiding spirit of the campaign was Prince A. Morrow, who organized a similar society in 1905. The discovery of the arsenicals in the treatment of syphilis and the sulfonamide derivatives in the treatment of gonorrhea proved to be two of the greatest achievements of the century in the control of venereal diseases.

The experience of the Army and Navy in dealing with the venereal diseases during World War I served as an impetus for the present day campaign. Through the provisions of the Social Security Act (1935), venereal disease control work was extended in a large majority of the states. In 1938 the United States Congress enacted the Venereal Disease Control Act which authorized the appropriation of funds to the states. These funds were to be allotted on the basis of population, extent of the venereal disease problem, and financial need.

The modern syphilis control program includes the following activities and facilities according to the United States Public Health Service.[11, 12, 13]

1. A trained public health staff which knows how to deal with syphilis.

2. Regulations requiring reporting and follow-up on all cases of syphilis.

3. Facilities for treatment of all patients—for both those who can, and who cannot pay.

4. Free laboratory service available to all physicians and clinics.

5. Distribution of free anti-syphilitic drugs to all physicians and clinics.

6. Blood tests for all pregnant women and treatment where required.

7. Blood tests for all persons before marriage.

8. Blood tests in all complete physical examinations.

9. An educational program.

10. Repression of prostitution.

Regarding the role of venereal disease control in national defense, Parran[14] states: "In every war the venereal diseases have been a serious drain on military efficiency. With federal aid under the Venereal Disease Control Act of 1938, there are now in operation more than three thousand treatment centers and more than two thousand diagnostic laboratories. Every state distributes free drugs to all physicians for treatment of their patients. As a part of the physical examination of every recruit for the Army under Selective Service, a serologic test for syphilis has been made."

MATERNAL CHILD HEALTH

The early workers in infant hygiene, namely Koplik in New York (1889), Herrgott, Variot and Budin in France (1890-1893), all advocated breast feeding of infants.[1] In 1909 the first American Conference for the Prevention of Infant Mortality was held in New Haven, which recommended the education of mothers in matters of sanitation and personal hygiene in the home. Other landmarks in the development of the child hygiene program are the following: Establishment of a Division of Child Hygiene in the New York City Department of Health in 1908; creation of the Federal Children's Bureau in 1912; enactment of the Sheppard-Towner Act for federal aid to local infant welfare work in 1922, and the organization of the American Child Health Association in 1922. The expansion of infant and pre-school welfare stations resulted from this renewed interest.

Among the chief public health activities responsible for the reduction in the United States infant mortality rate for the past quarter of a century are the following: (1) Education of mothers in infant care; (2) improved sanitation; (3) improvement in quality and quantity of prenatal care.

Regarding the maternal hygiene program, its main objectives include the following: (1) Reduction of maternal morbidity and mortality; (2) expansion of prenatal care; (3) accurate reporting of maternal deaths.

Title V of the Social Security Act has been highly instrumental in the general expansion of maternal child hygiene programs. This Act provides for an annual appropriation of $3,800,000.00 to the states for the following purposes:

Part 1. For the organization of intensive efforts to reduce maternal and infant mortality and to promote the health of mothers and children.

Part 2. To meet the special needs of crippled children by providing diagnostic, corrective, and follow-up services for chil-

dren already crippled or suffering from conditions which may lead to crippling.

Part 3. The development of social service for homeless, neglected, and dependent children in danger of becoming delinquent in areas predominantly rural.

SCHOOL HYGIENE

Medical examination of school children was initiated in this country in Boston in 1894. This program was prompted by an outbreak of diphtheria in the schools, and the primary objective was the control of communicable diseases.

Present day school health programs include the following activities: medical examinations, prevention and early correction of physical defects, immunizations, health education among pupils and teachers, and sanitary supervision of school buildings.

It is considered good public health practice to concentrate attention on children in the early grades so as to correct physical defects early in the school life of the child so that they will not interfere with studies.

PUBLIC HEALTH NURSING

The development of public health nursing played a very important role in the evolution of the modern public health movement. The first Visiting Nursing Association was established in Boston in 1886. In 1892 the school nursing movement was initiated in London and tuberculosis nursing received a tremendous impetus in this country under the influence of Osler (1903). The tendency at that time was toward specialized nursing, such as infant welfare nursing, industrial nursing, school nursing, and tuberculosis nursing. The pendulum has swung in the opposite direction today and modern public health practice demands a generalized public health nursing service, especially in rural areas.

All programs of the county health department utilize the services of the nurse. The National Organization for Public Health Nursing has defined this activity thusly: "Public health nursing is an organized service (not for profit) rendered by graduate nurses to the individual, family, and community."

INDUSTRIAL HYGIENE

The industrial hygiene program is still in its infancy. The objectives of the program are: (1) To promote the personal hygiene of the industrial worker, and (2) to prevent health hazards through control of environment.

An abbreviated classification of occupational health hazards and disorders follows:

(1) Air conditions: (a) temperature, humidity, comfort zone; (b) pressure; (c) pollution such as dusts, gases, fumes, vapors, and bacteria. (2) Industrial-chemical poisons, dermatoses; (3) injuries.

Special programs for the control of venereal diseases and tuberculosis are in effect in many industries.

During the present national emergency, the importance of industrial hygiene is receiving particular attention because the authorities realize that men engaged in industries essential to the defense of our nation are just as important as the men in uniform. The responsibility for safeguarding the health of the worker lies first in the hands of the State and local health or industrial authorities.[14] The interest of the United States Public Health Service, the Army and the Navy, served as a tremendous impetus to the development of industrial hygiene programs in this country. Paul V. McNutt, Coordinator of Health, Welfare and Related Activities, National Defense Council,[15] in a discussion of special problems in our health defense states: "The military services are responsible for the soldier, but public health is responsible for his ally, the industrial worker. In today's war, industrial mobilization and expansion make possible military mobilization and expansion. In the speeding up of industry, our responsibilities in the field of industrial hygiene are multiplying."

The responsibility of the public health nurse in industrial hygiene has assumed greater importance with the expansion of industry incident to national defense.[16]

MENTAL HYGIENE

This new activity of the modern public health movement has been incorporated in

many state health department programs in recent years. Clifford Beers, author of "A Mind that Found Itself," was instrumental in bringing about wide sweeping reforms in the administration of mental hospitals. Another noteworthy advance in this field was the organization of the National Committee for Mental Hygiene in 1909.

The present day need for a clear cut program for civilian mental health was pointed out recently by W. B. Miller, Assistant Federal Security Administrator.[17]

At the present time there are some 750,000 patients with mental and nervous diseases in American institutions, whose care costs the United States about $250,000,000.00 annually. Furthermore, mental disease is on the increase. There are in the United States today some 3,000 trained psychiatrists, 6,000 psychiatric nurses, and 1,500 trained workers in the social aspects of psychiatry and occupational therapy. There is a definite need for more personnel in this field of preventive medicine.

Mental hygiene is concerned with the abilities of people to adapt themselves to life; to live happier, more productive lives. It is a public health problem because the mortality rates of the mentally diseased are at least five times as high as the rate for the general population.[18]

Vogel[18] proposes the following steps in organizing a mental hygiene program: (1) The establishment of a division or department of mental hygiene or mental health, headed by a full time psychiatrist of special qualifications in each state; (2) organization of a mental hygiene or psychiatric clinic in every community, county, or city having a health department.

PUBLIC HEALTH NUTRITION

As early as the eighteenth century, a very important discovery in the field of nutrition was made. Captain Cook, of the English Navy, cured scurvy among his sailors by giving the juice of citrus fruits.

During the past thirty years, knowledge regarding dietary essentials and the foods containing them has made tremendous strides. Today a clear understanding of the etiology and cure of the deficiency diseases is common knowledge to all practitioners of medicine.

Parran,[19] in a recent discussion of the public health aspects of nutrition, stresses these points: (1) Evidence of unsatisfactory nutrition as a public health problem; (2) evidence of inadequate dietaries as the most common cause of mass malnutrition; (3) method of attacking the problem.

It has been estimated by reliable sources that just about one-third of the total population of the United States is receiving diets containing all the essentials. Statistics show that a large proportion of low income and relief families subsist on inadequate diets.

Dietary deficiency diseases such as scurvy, rickets, and pellagra are mentioned as public health problems. Parran contends that dietary deficiencies can be eliminated by mass education in nutrition.

Shepard,[20] in a discussion of public health needs in national defense, points out the high incidence of malnutrition in this country where food is plentiful. He recommends public health education in nutrition as a solution to the problem.

The subject of nutrition in national defense was discussed at the Nineteenth Annual Conference of the Milbank Memorial Fund recently.[21] It was pointed out here that adequate supplies of the right kind of food are an important part of the "total defense" work. A new flour and bread enriched in vitamins and minerals, were recommended as a national measure for promoting better nutrition. Other recommendations were: (1) The correction of malnutrition among industrial workers, and (2) adoption of a plan of popular education in diet.

PUBLIC HEALTH DENTISTRY

Public health dentistry has been expanded considerably through funds provided by Title VI of the Social Security Act.[22] The first statewide program of dental hygiene was put into effect by the State of North Carolina in 1918. Between 1935 and 1940, twenty-three states added

dental health programs. There is a diversity in the type of dental health programs in effect today.[23] Some are purely educational and have to do with diet, and use of the tooth brush; others include dental inspections with recommendations to the parents, and still others provide for correction of dental defects. The main elements of the program should be dental inspection and subsequent correction of dental defects.

PUBLIC HEALTH EDUCATION

The value of public health education was appreciated as far back as 1873, when Elisha Harris made the following statement at the first meeting of the American Public Health Association:[2] "In the United States, the permanent value of any method or system of sanitary government will depend upon the degree in which the people are generally enlightened, concerned, and made responsible, in regard to sanitary duties." All personnel of the health department are health educators in the broad sense of the word, because all programs of necessity involve this activity. Smillie[2] states: "No public health program can be completely successful in the United States unless it has the confidence and support of the people that benefit by it. Full support cannot be secured unless the people understand the purposes and objectives of the program."

Present day activities in this field include the following:[2] (1) Training of school children in matters of personal and community hygiene; (2) dissemination of health information to the general public by means of pamphlets, posters, lectures, moving pictures, radio programs, and newspaper articles.

In a discussion of the philosophy of public health education, Bauer[24] mentions the following qualities which a good health educator should possess: (1) Honesty in reports and generalizations on health conditions and needs; (2) spirit of earnestness and having the courage of one's convictions; (3) devotion to accuracy; (4) logic; (5) spirit of tenacity of purpose; (6) sense of humor; (7) efficiency; (8) diplomacy; (9) emphasis on fundamentals; (10) background of culture; (11) technic employed; (12) ingenuity; (13) objectivity; (14) novelty.

VOLUNTARY HEALTH AGENCIES

The voluntary health agencies have played a very important role in public health history and should be considered as the vanguard of the modern public health movement.

The first voluntary health agency to be established in the United States was the Association for the Prevention of Tuberculosis (1904).[2] District nursing associations had their origin in New York City in 1877 in the form of a charity society for the nursing care of the sick poor. The Red Cross is a national organization whose function is primarily disaster relief (1900). The American Social Hygiene Association was established in 1905; the American Child Health Association in 1909; the National Committee for Mental Hygiene in 1909; the American Society for the Control of Cancer in 1913. The American Public Health Association was organized in 1872.

THE PUBLIC HEALTH PROGRAM UNDER TITLE VI OF THE SOCIAL SECURITY ACT

The expansion of the public health programs of state and county health departments was made possible by the provisions of Title VI of the Social Security Act (1935).

Title VI of the Social Security Act provides for the following appropriations:[25]

1. An annual appropriation of not to exceed $8,000,000.00 for the purpose of assisting States, counties, and health districts and other political subdivisions of the states in the establishment and maintenance of adequate health services, including the training of personnel for state and local health work.

2. An annual appropriation of not to exceed $2,000,000.00 to the Public Health Service for research activities of the Service and for the expense of cooperation with the States in the administration of the Federal funds granted for aid in the establish-

ment and maintenance of state and local health services.

Coffey[22] has recently discussed the subject of the expansion of public health facilities under Title VI. He states that it was designed to stimulate the expansion of programs already under way and to fill some of the gaps in public health activities with new programs. He presents some of the more important advances in public health programs since the enactment of the Social Security Act in 1935. The first one is pneumonia control. In 1935 no state was administering an organized statewide program of pneumonia control, whereas today thirty-four states have such programs in operation.

The cancer problem is another one of major importance. In 1935 only three states had cancer control programs. With the aid of Title VI funds the number has increased to sixteen. Cancer control activities include the following: Prevention through education, state aid in treating the indigent, free tissue diagnosis for physicians, the postgraduate education of physicians, and compilation of vital statistics.[22]

Another program which benefited by Title VI funds is public health dentistry. There has been a substantial increase in the number of statewide dental health programs for the indigent and semi-indigent since 1935.

In 1935 only three states were conducting industrial hygiene programs, whereas today thirty-one states have such programs in operation.

Coffey[22] further states that the improvement of the quality of public health personnel was made possible by Title VI funds. Since 1936 the state and territorial health departments have authorized the training of 5,419 trainees, 80 per cent of whom had their expenses defrayed in whole or in part, out of Title VI funds.

SUMMARY

A brief history of the modern public health movement has been presented. The following points were discussed: Origins of public health, the three eras of the modern public health movement, the various new programs included in the movement, the history of county health organizations, voluntary health agencies, and the Public Health program under Title VI of the Social Security Act.

The pioneers of the modern public health movement are worthy of a tribute from the present day public health personnel. Their achievements are responsible for public health as it is practiced today, and will forever shine as a beacon light for the guidance of the public health profession. May their monumental contributions to public health knowledge and practice forever serve as an impetus for further research and progress.

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POOL PLASMA BANK AS USED BY THE L. S. U. DEPARTMENT OF OBSTETRICS AND GYNECOLOGY*

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Serum and plasma have been used as far back as 1871 by Bowdich and one year later by Luciani. Amberson's bibliography contains an excellent review on earlier experimental work on plasma and serum. The first extensive clinical use of plasma and serum was in 1927 at the Bryn Mawr Hospital, Philadelphia, Pennsylvania.

Present day widespread usage of plasma depends upon a proper method of collecting, preparing and storing. Anyone intending to establish his first plasma bank might feel confused or uncertain as to the best procedure, because of the variety of information and diverse methods in use. However, we have, without previous experience, organized a practical, inexpensive plasma bank. Even though our apparatus may not appear impressive in detail, nevertheless it has proved effective in actual results. In practicability, it has compared favorably to the more elaborate types. Under the present emergency, constant improvements in equipment and procedure should eventually bring about a general agreement in collecting and storing plasma. Until such standardization occurs, our method shows that it is unnecessary to invest in expensive equipment that soon may grow obsolete.

In the obstetric and gynecologic service of the New Orleans Charity Hospital, blood is collected by a closed system method. The venipuncture set consists of a length of good quality tubing with an observation tube and needle. The blood storage bottle contains 70 c. c. of 5 per cent sodium citrate, which is preferable to the 2½ per cent, as there is much less protein precipitate in stored plasma. At the present time we are using Upjohn bottles and sets which have proved suitable, but any other similar kind will suffice. After blood is drawn, it is placed into the reserve blood bank and allowed to remain about five days. If not then used, the plasma is collected, stored, and removed before the seventh day. Hemolysis increases following this period, and free hemoglobin and potassium may saturate the plasma which in turn may often cause reaction in patients. This bank has been in operation for five months, through March, 1942, and at the present time we have about 25,000 c. c. in reserve and ready for instant use.

The plasma collecting apparatus consists of the following: one clean table with sterile drapes, all articles used autoclaved; a 1000 c. c. flask containing 10 c. c. of 1 per cent merthiolate as a preservative; a collecting-bottle stopper containing two openings—a short glass tubing being inserted in one, a suitable filter being placed on the inlet side. Two lengths of rubber tubing are used, one connecting to a suction which may be electric, water or bulb, the other tubing joining the filter to a collecting needle. The needle is then placed into the supernatant plasma about one-half of a centimeter above the cell layer, and a small alcohol-saturated sponge is placed into the neck of the bottle to prevent airborne contamination while the plasma is being withdrawn.

Each bottle contains 1000 c. c. of plasma, is sealed and allowed to remain at room temperature for four days. After a cul-

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ture is made in brain broth and on an agar slant the plasma is then returned to cold storage. The inoculated media is kept in an incubator for seven days with a daily checking and if no bacterial growth or fungus is obtained, the plasma is considered sterile.

Since November, 1941, through March, 1942, we have collected approximately 90,000 c. c. of plasma by this simple but effective method and have had only one contamination. In this same period, over 50,000 c. c. have been given without a reaction other than a chilly sensation that was experienced in three patients. This may be explained by the fact that the plasma is never warmed before using.

A 1000 c. c. bottle contains plasma taken from four or five donors and is stored for three weeks to a month. When the maximum precipitation has occurred, it is then broken down into 500 c. c. and mixed into eight or ten donor-units, using our collecting apparatus for the process. This is accomplished by combining plasma from two bottles, withdrawing 250 c. c. from each bottle. Each 500 c. c. is again cultured after 48 hours and if the unit is not contaminated it is stored in an ice box until used.

Plasma collected is practically free of hemoglobin and potassium, but contains considerable flocculation. The maximum flocculation and precipitation occurs in the first month; thereafter it is fractional—hence the breakdown into mixed donor lots after the first month. Clarification can be obtained by using a Seitz filter which will remove all precipitated proteins for a short period of time. If such a filter is not available, a suitable substitute can be obtained by the use of small glass beads and a fine wire-screen mesh. Plasma can be kept at room temperature if proved sterile, but the danger of bacterial growth and contamination is less apt to occur if kept in cold storage.

In the application, we have used plasma to maintain blood pressure in patients who have pre- and postpartal hemorrhages, and in all patients on the gynecologic service who go into shock from hemorrhages of various causes. Toxemia cases, whose serum proteins are lower than four, are given massive transfusions of plasma. Those patients who need blood while being anesthetized for surgical procedures are given plasma rather than blood, because whole blood might cause a reaction that cannot be observed during this period. This danger is greatly lessened by the use of plasma.

SUMMARY AND CONCLUSION

On the whole, the advantages offered by our simple apparatus more than offset the differences when compared to the highly technical and expensive sets. Not only practical and economical, but it does not require a special laboratory or expert technician to operate it. The fact that it can be used repeatedly without expensive replacements makes it especially feasible where funds are limited. Considering how efficient it has proved by merely observing ordinary aseptic precautions, we feel until there is a general standardization such similar apparatus can be used for collecting plasma.

DISCUSSION

Dr. Harry A. Davis (New Orleans): Drs. Lehman and Suter are to be congratulated on their timely presentation. As you all know, in view of the present situation all over the world, there has arisen a great need for the use and preparation of blood plasma and serum. There has been in the past a considerable amount of discussion as to which is the more efficacious, plasma or serum. Much of this discussion is based on reports which emanate particularly from France and from Russia. I think most of the recent work seems to suggest that there is essentially no difference in the clinical results obtained by the use of serum and plasma. Nevertheless, we notice that the Army and Navy are using plasma entirely.

It is not my purpose to discuss the advantages of plasma in the liquid state. There are advantages from the point of view of economy. On the other hand, the refrigeration which is required may prove rather expensive, particularly when one desires to prepare this material in large quantities.

The question of reactions must be considered. There has appeared very little in the literature regarding the incidence of reactions following the use of plasma and serum, and it is only recently, within the last year or so, that one finds some reports creeping out. In looking over the literature

on the use of this material, one finds that in the Russian journals reports have appeared giving an incidence of 3.5 to 25 per cent.

I did not gather from Dr. Lehman's remarks whether this plasma is typed before they use it. There has been, since the work of Levinson and Cronheim, a tendency to avoid all typing and just rely upon the mixture of serums to obtain a low titer of agglutinins. However, it will be found that if one pools serum or plasma that occasionally one will get serum or plasma with a high agglutinin titer which will produce serious effects. An illustration of this is the recent report of Polayes and Squillace of a near-fatal reaction following the use of dried pooled plasma. I think we are going to arrive more and more at the idea of using typed sera. I think we are going to type the plasma and sera, or are going to determine the agglutinin titer of pooled lots of sera. We do not do this at present.

Finally, the question of flocculation in plasma is one which has bothered persons working with this material. It can be avoided by mixing mixed plasma with an equal volume of normal salt solution. In this way fibrin clot formation is reduced to a minimum. However, it is essential to filter all materials before using, because fatal reactions may result if fibrin clots are present.

Dr. John H. Connell (New Orleans): I wish to express my appreciation at being able to see what work is going on in the plasma field at the Charity Hospital in this city. For the past two and one-half years I have maintained a plasma bank in Pineville and we have given more than 300 transfusions. We have a slightly more elaborate system than demonstrated herein. There is however on the market today equipment which is simplicity in itself and which can be utilized in the smallest of hospitals and clinics. This is a completely closed system of vacuum bottles which several firms have placed on the market. The unit price of final containers holding one pint is only approximately $1.45.

As to the clinical use of plasma I cannot say enough. There are few things in the armamentarium of a physician which can definitely save lives and this is one which will do just this in many instances. We have had to give as much as 3500 c.c. of mixed plasma to a single patient in order to accomplish such a result and we have never had adverse reactions.

As to the question of typing serum I must disagree with Dr. Davis on the subject. At Charity Hospital here in New Orleans, we conducted an extensive investigation on the cross matching as also has been done at the Mayo Clinic and have found that cross matching of blood for transfusions is not necessary. The serum of a so-called incapable donor is too much diluted within the recipient to cause adverse reactions.

I have personally seen over 75,000 transfusions without cross matching the blood with no serious reactions. In addition, in the use of plasma, we pool plasma from ten different donors thus neutralizing agglutinins. Reactions from plasma in my experience have been less frequent than reactions from normal saline, glucose, and so forth. Slight reactions which do occur with intravenous medication are usually due to the apparatus which has been improperly cleaned.

Dr. Joseph Cohen (New Orleans): There is much unofficial discussion, by the man on the street so to speak, regarding the donation of blood for war purposes. A question was asked me by one of my patients regarding the effect of mixing negro blood with white blood, and whether it is being done. Therefore, do I desire to raise this question here, and inasmuch as there are doctors present who seem to know quite a bit about plasma and blood transfusion, I would like to pass on to them this question.

We just heard from one of the speakers that at Charity Hospital they gave as many as 70,000 to 100,000 transfusions and that they collect sometimes as high as 9,000 c.c. of blood plasma in a short space of time. I wonder, then, if by chance, some of the plasma some of the white patients received was from colored donors, and if some that the colored patients received was from white donors. And I wonder if there was any reaction noticed.

That is a question that will come up pretty seriously in the near future. We have quite a number of negro soldiers in the Army now and with so many negro soldiers and white soldiers working side by side, an emergency transfusion may become necessary. Doctors may be faced with the necessity of using negro blood on white soldiers and white blood on negro soldiers. What will be the reaction? Some of us have ideas on the question. Others may want enlightenment on this question. Now is a good time to discuss it.

Dr. Joseph A. Danna (New Orleans): In partial answer to Dr. Cohen I might say this: The Red Cross is the agency through which plasma is now being prepared for the Army, through which the donors have been secured; and the Red Cross has not taken any negroes anywhere in the country. Now, I do not know where these transfusions he speaks of have been done. Red Cross headquarters has given instructions throughout the country not to accept negroes for this particular purpose. There has been a lot of trouble caused the Red Cross over that fact, because the negroes feel their blood is as good as somebody else's and they feel they should be able to give the blood. There is nobody who feels more like a Southerner than I do, but we are tending toward finding some day that cows' plasma and pig plasma is going to be just as good as human plasma. Now, if we can use cows' plasma and pig plasma or even dog

plasma, it seems to me that negro plasma would not be so bad at that.

Dr. B. J. Lehman (In closing): In reply to Dr. Davis' query, we type all blood before removing the plasma and try to mix as many types as possible. Often it is impossible to get all four types but at least three are always used in breaking down the plasma into eight or ten donor-units per 500 c.c., and up to the present time there have been no undue reactions.

In so far as all our plasma and blood have a negative Wassermann, in severe obstetric emergencies where plasma of one race is not available, we do not hesitate to use colored plasma in white patients or white plasma in colored; so far, there have been no reactions.

It was stated in the paper that our set is simple. There is no expense after the initial cost, and the apparatus will give the same results as any elaborate or expensive one. We did not have any alloted funds and used only the available infusion and transfusion sets that were in the hospital. The incidence of contamination was very low, as mentioned in the paper, and will compare favorably with any other present method of collecting plasma.

THE MANAGEMENT OF RETRODISPLACEMENTS OF THE UTERUS WITH SPECIAL REFERENCE TO THE INDICATIONS FOR SURGICAL THERAPY*

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Backward displacement of the uterus, probably because it is so simple to demonstrate, was a very popular subject for discussion in the days when gynecology was developing as a specialty but microscopic pathology and other refinements of diagnosis and treatment were still unknown. Articles of 50 and 75 pages were written about it, more than a hundred different operations were devised for its correction, and in 1887, according to Skene[1], more than 300 different types of pessary were in use. In that same year G. R. Bantock[2] of London, speaking before the American Gynecological Society, solved the problem to his own satisfaction and unconsciously put his finger on what is still the chief source of confusion in the treatment of uterine retrodisplacements. He never, he remarked, troubled himself with the cause of such a displacement any more than he would trouble himself with the cause of a broken bone; he merely used a pessary and let it go at that. Ever since that time other gynecologists and surgeons have been treating retrodisplacements by pessaries or by surgery with the same disregard of the fundamental causes of their existence. In that disregard, I have no doubt, can be found the origin of most of the confusion, most of the lack of success which attend so many of our attempts to treat this malposition of the uterus, and most of the embarrassment with which many of us—and I include myself in all that I am saying—look back upon our past endeavors in this field. I never deliberately ignored the causes of a retrodisplacement, as Dr. Bantock so complacently stated that he did, but I know that I have not concerned myself enough with them.

There are other reasons, of course, for the confusion. There is still apparent the old tendency to argue along the general lines: This woman has a retrodisplacement, therefore this woman needs a suspension operation. The argument is wrong for a variety of reasons. It does not in the least follow that because a woman has a backward displacement she must have a surgical correction of it. It does not follow, and this holds for a large number of cases, that she needs any treatment for it at all. Emmet,[3] who was then a voice in the wilderness, was making that point in 1887. Equally important, if she should need an operation, it does not follow that a suspension operation will meet the situation. In the majority of instances, if only a suspension operation be done, the patient will receive very limited relief if she receives any at all. Moreover, unless the type of suspension is selected with a good deal of care, it may do

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her considerable harm and occasionally it may even put her in jeopardy of her life.

Finally, although the anatomy of the pelvic diaphragm and pelvic floor is difficult to comprehend, there is no reason at all for the obscurity with which many writers have managed to cloak it. The concept of uterine suspension and support has been completely overlooked in a welter of anatomic details, which, important though they are, are of no importance at all until basic principles are understood.

Everything that I have been saying leads to one conclusion: The correction of retrodisplacement of the uterus, in women in whom any correction is necessary, is usually a simple and usually a satisfactory undertaking when once the causes of the malposition and the anatomic background against which the procedure must be carried out are clearly understood. In a presentation of limited length I must necessarily over-simplify the subject, but my purpose is to return to first principles, and first principles are necessarily of a very elementary character.

THE CONCEPT OF UTERINE SUSPENSION AND SUPPORT

The uterus is a mobile organ, whose normal position is one of moderate anteflexion. It is fixed in the pelvic cavity only at one point, the uterocervical junction and the lower third of the fundus. The cervix, the position of which is chiefly determined by the position of the fundus, lies at an obtuse angle to it and at right angles to the vagina. The uterus is kept in its normal position of anteflexion by intra-abdominal pressure exerted against its posterior fundal surface, but it may change its position, for various reasons, within an arc of 180 degrees. Such changes, however, except during pregnancy, are always transient, and even after pregnancy the uterus returns to its original position unless there has been a fundamental alteration in the elasticity of its supports or in its intrinsic muscular structure, or in both.

The uterus is both suspended and supported in the peritoneal cavity by a mechanism which may be conceived of as consisting of three separate levels:

1. The upper or suspensory level consists of the round and broad ligaments. The round ligaments, made up of connective and unstriped muscle tissue, extend from the uterine cornu to the inguinal canal and serve as the ridgepoles of the tent-like structures known as the broad ligaments. These ligaments, which are made up of connective tissue, contain the vascular supply of the uterus. The round and broad ligaments suspend the uterus but do not support it.

2. The middle or supporting level consists of the anterior pubocervical fascia, the posterior uterosacral ligaments, and the lateral cardinal (Mackenrodt) ligaments, which fuse with each other to form an elastic sling or set of springs in which the uterus is maintained in labile equilibrium in the peritoneal cavity. The pubocervical fasciæ arise from the anterior aspect of the uterus and extend to the pubic bone, thus maintaining the normal anterior curve of the vagina. The uterosacral ligaments are strong musculofibrous bands which arise from the posterior surface of the uterus near the internal os and encircle the rectum, to fuse with the fascial covering of the second and third sacral vertebrae. They are composed of connective tissue and nonstriated muscle, and they exert considerable traction on the cervix; by their semi-diaphragmatic action they also divert intra-abdominal pressure from acting directly against the rectovaginal fascia below them. The cardinal or Mackenrodt ligaments extend from the lateral aspects of the uterus to the bony pelvis on each side. They are made up of strong connective and unstriped muscle tissue and are the main musculofascial support of the uterus, acting for all practical purposes as a fulcrum around which it swings.

3. The lower level also has a supportive function. It consists of the perineal body, which maintains the normal posterior curve of the vagina, much as the pubocervical fasciæ maintain the normal anterior curve. If

the vagina were not a curving canal the cervix, by sheer force of gravity, would tend to slide down it, as if down a toboggan, dragging the uterus and its associated structures along with it.

The second and third levels of the mechanism which has just been described have, by the very nature of their anatomic structure, a true supporting function. The upper level, however, is merely suspensory. That can readily be proved. As Baer[4] suggested, if the nulliparous woman is examined when her abdomen is opened, it will at once be apparent that the round ligaments are considerably longer and the broad ligaments are somewhat longer than the distances between their points of attachment (the uterine cornu and the inguinal ring). It can also be demonstrated that these ligaments do not become absolutely taut even when the uterus is displaced manually into a position of extreme retroversion. If, on the other hand, a cadaver were so dissected that the pelvic floor and the supporting diaphragm of the uterus were removed, both retroversion and prolapse would promptly occur. However normal the round and broad ligaments might be, they could not hold the uterus in its normal position of anteflexion if they were not assisted by other structures whose function was supportive and not suspensory like their own.

THE PATHOLOGY OF RETRODISPLACEMENT

On the basis of the anatomic facts just outlined, certain broad propositions can be stated: (1) If the suspensory ligaments of the uterus alone are injured (a situation which seldom comes to pass), the excursion of the fundus is extended, the tendency to anteflexion is decreased, retroversion may occur, but symptoms are not likely to develop. (2) If the pelvic diaphragm is injured, retroversion will occur, regardless of the state of the suspensory ligaments, and may or may not be accompanied by symptoms. (3) If the pelvic floor (perineal body) is injured, prolapse will be associated with retroversion, even if the diaphragm is not greatly damaged, and symptoms will probably develop. (4) If the perineal body is undamaged, even if the fascial supports are considerably damaged, the uterus, at least for a time, cannot settle below a certain level in the pelvis and only a moderate degree of prolapse can occur, which is, however, likely to be symptomatic.

Disregarding for the moment the etiology of these injuries, let us consider the pathologic chain of events. As the supporting ligaments of the uterus, as well as its own musculature, fail to play their part in the maintenance of its normal position, the fundus slowly sags backward and downward. First it points to the promontory of the sacrum, then to the hollow of the sacrum, and finally to the sacrococcygeal articulation. When this stage of retrodisplacement has come to pass, the fundus lies in the cul de sac, below the level of the sacrum, and the cervix, which has necessarily changed its position with the change in the position of the uterus, points toward the bladder. The lengthened uterosacral ligaments not only permit the fundus to sag backward but also permit the whole organ to sink to a lower level in the pelvis. If associated injuries of the pelvic floor and pubocervical fascia have damaged or obliterated the normal curve of the vagina, the cervix slides downward in its axis, which has now become straightened rather than curved, and the uterine fundus and attached bladder necessarily follow. The tubes and ovaries, whose position is dependent on that of the uterus, are also displaced downward. As the uterus begins to sag permanently backward, the intestines enter the vesico-uterine space and thus separate the uterus from the bladder, against which it normally lies. Intra-abdominal pressure, formerly directed against the posterior aspect of the uterus, is now directed against its anterior aspect, and the very force which once held the fundus in a position of anteflexion now forces it farther and farther backward in its new position of retroversion. Furthermore, the impact of the same pressure against the weakened pubocervical fascia still further encourages the tendency to prolapse.

CLINICO-PATHOLOGIC PICTURE

The symptoms of retroversion and associated prolapse of the uterus are easily ex-

plained. Backache, which occurs in 75 per cent of all cases, is partially due to traction of the abnormally heavy uterus on the uterosacral and cardinal ligaments, which are in a state of chronic fatigue, and partially to chronic infection of the cervix, which, by contiguity, extends outward into these ligaments. Actual pain is not usual unless there are marked varicosities of the broad ligament. There is, however, a frequent sense of weight and pressure, increased by standing and exertion, which is partly due to the increased size of the uterus, partly to its prolapse, and partly to the uneven distribution of the uterine weight. This weight is now borne entirely by two sets of attenuated ligaments, the uterosacral and the cardinal, instead of being distributed among five sets, as nature intended it should be.

Dysmenorrhea, although partly an exaggeration of this permanent discomfort, is also due to chronic passive congestion of the uterus, which is frequently associated with hyperplasia of the endometrium and which is always more marked at the beginning of the menstrual period. Endometrial hyperplasia is itself due to multicystic changes in the ovary. Here the chain of events is circulatory disturbances, retarded ovulation, and overproduction of estrogen for priming the endometrium. The pathologic process is expressed clinically as menorrhagia. Leukorrhea results either from injuries of the cervix or from chronic passive engorgement of the uterus or from both.

Constipation may be caused by pressure of the fundus on the rectum and consequent interference with normal peristalsis. Vesical irritation may be caused by marked degrees of displacement and prolapse, with resultant distortion of the vesical neck. If sterility is present, it is usually merely a part of the whole picture of congenital deficiency; it is not caused by retroversion unless the tubes should be kinked by the malposition. Abortion, in my own experience, is seldom caused by backward displacement. The constitutional reaction may include weakness, malaise, headaches, and gastric and nervous phenomena.

The degree of retroversion is not necessarily an index of the intensity of the symptomatology, and vice versa. There are cases in which exaggerated symptoms can be definitely related to first degree displacements, and cases of third degree displacement and almost complete prolapse in which the patients complain of little more than the discomfort of the extruded mass and urinary symptoms due to distortion of the regional anatomy. The patients who make up the latter group of cases are usually elderly women, past the menopause, in whom atrophic changes are already present. The uterus is therefore not hyperplastic, there is no excessive weight on the ligaments, and disturbances of function, since function has ceased, would scarcely be expected.

THE ETIOLOGIC FACTORS OF UTERINE RETROVERSION

The instances of retroversion caused by trauma in the ordinary sense of the term are so rare as to demand no consideration at all. In a certain proportion of young women, variously estimated at from 10 to 25 per cent, the uterus is in a position of retroversion for congenital reasons. In such cases other congenital defects are usually present also, such as a short anterior vaginal wall, ovarian hypoplasia, and other evidences of infantilism.

The most common cause of both transient and permanent retroversion is relaxation of the uterine supports in parturition. During pregnancy all the pelvic structures are enormously hypertrophied, and the uterine supports, because of the weight of the gravid uterus, become attenuated, the degree of attenuation usually being dependent upon their initial state of development. In most cases, when the supports are in good condition and labor proceeds normally, with a minimum of operative interference and that properly instituted, pregnancy does not cause permanent damage. The original tone and form are never quite regained, but the structures return approximately to their original state and if retro-

version does occur, it is only transient and is readily corrected.

Permanent retroversions chiefly though not entirely occur in the group of cases in which labor has been improperly conducted. Sometimes it has been allowed to drag out too long, sometimes it has been terminated too swiftly by the application of forceps or by breech extraction or by the use of oxytocics before full dilatation of the cervix. After labor the damage may be aggravated by too early a return to the upright position, too early exercise or hard work, failure to use a proper abdominal support, and similar mechanical causes. Repeated pregnancies at short intervals are likely to increase the initial pathologic change, although a single pregnancy in women with congenital defects of the pelvic tissues may work as much harm as repeated pregnancies in a better developed woman. A large proportion of the cases in which the trauma of labor results in aggravated retroversions, whether or not parturition is properly conducted, is derived from the group of women whose fascial supports are congenitally under-developed.

THE PRINCIPLES OF THE CORRECTION OF RETRODISPLACEMENTS

There is not very much to do about the fundamental cause of all retrodisplacements of the uterus, that the abdominal viscera were originally designed for individuals who walked upon all fours and that the necessary adaptations for the change to the upright position have not always been made in the individual case. There is usually no need to do anything at all about congenital retrodisplacements, since in the great majority of cases they give rise to no symptoms at all. In fact, in this kind as in all kinds of retrodisplacements it is a very good rule for the gynecologist to follow that he should refrain from treating any malposition which has no symptoms directly referable to it. In the occasional case, however, a congenital displacement does give rise to symptoms, and if the cause and effect relationship can be demonstrated, that is, if relief follows the wearing of a pessary for six or eight weeks, there is both justification and indication for surgical correction. On the other hand, the wearing of a pessary cannot bring about permanent cure. The structures are fundamentally deficient and there will be a reversion to the original conditions as soon as the mechanical support is removed.

Displacements which follow parturition are divided into two groups, the transient type in which the retroversion is due to subinvolution of the uterus, and the permanent type in which it is due to actual damage of the fascial supports and perineal body. It might be well to point out here that neither type can be demonstrated immediately after delivery. For the first 10 to 14 days thereafter the uterus is too large to be contained in the true pelvis, and examination before the woman begins to move about may not reveal a malposition even when descent into the pelvis has occurred. It is never possible to state positively that a retrodisplacement is not present until an examination has been conducted six or eight weeks after delivery.

There is no doubt that the incidence of all postpartal retroversions can be reduced by prophylactic measures, such as the proper conduct of labor and abstinence from interference until full dilatation has occurred and it is clear that interference is indicated. The incidence of subinvolution, which is an actual cause of transient retroversion and an auxiliary cause of permanent retroversion, can be reduced by such measures as a sufficiently long stay in bed, the use of a properly fitted corset, the elimination of an abdominal binder unless there is a special indication for its use, attention to bowel and bladder function immediately after delivery, frequent changes of position in bed, the use of hot douches and oxytocics, and sometimes the use of the knee-chest position. I have never personally seen a great deal accomplished by special exercises, such as the monkey trot and the kangaroo walk, and Van Auken[5], whose personal results were only 6 per cent better in treated than in control cases, comments on how widely the reported results of these exercises differ.

If in spite of these precautions full involution does not occur, hot douches, oxytocics and similar measures should be continued while at the same time the weight of the abnormally heavy uterus is taken off the ligaments and they are given a chance to revert to their normal elasticity. The wearing of a Smith or Hodge pessary for six or eight weeks accomplishes this result, and thereby corrects the retroversion, in most of these cases.

A different type of problem is presented by the woman whose displacement is due to actual injury of the pelvic structures. A pessary will not help her permanently, for, just as in the congenital type of malposition, when once it is removed the uterus will sag backward and downward. It sometimes will not help even temporarily, for a relaxed introitus may lack sufficient musculature to hold it in the proper position, and it will either slip out entirely or exert its force directly at the point at which the uterus tends to hinge, so that the malposition is really aggravated. An operation is the only treatment of value in such cases, though it should not be resorted to until a therapeutic test with a pessary has been carried out, unless, of course, the cause and effect relationship is unmistakable.

SURGICAL PROCEDURES

What should be done for the patient with an acquired symptomatic retroversion for which surgery is indicated depends upon several considerations, chiefly the extent of the displacement, the associated injuries, the severity of the symptoms, and the patient's age and parity. In a young woman, who has only one or two children and whose pelvic structures are fundamentally sound, every effort should be made to preserve the pelvic organs. In an older woman, who has already borne her quota of children and whose functional days are over, a useless organ may be removed without compunction if it is diseased or otherwise abnormal, or merely if its removal would simplify the remainder of the operative procedure. In both young and old, however, the operation should include, according to the extent of the injuries present:

1. Restoration of the pelvic floor by perineorrhaphy.

2. Plication of the pubocervical fascia and correction of the cystocele by anterior colporrhaphy.

3. Shortening of the cardinal ligaments by plication on the anterior aspect of the uterus, the operation being performed through the vagina (Manchester method) or intra-abdominally, as may be most convenient.

4. Shortening of the uterosacral ligaments by plication, and partial closure of these ligaments, so as to divert the full force of intra-abdominal pressure from the rectovaginal fascia on the next lower level.

5. Shortening of the round ligaments by some sort of suspension operation.

The results of these procedures can also be reduced to outline form:

1. By restoration of the pelvic floor and repair of the pubocervical fascia the normal curve of the vaginal canal is restored and the tendency of the uterus to prolapse along with the cervix is controlled.

2. By shortening the cardinal ligaments the uterus is elevated to and maintained in its original level in the pelvis.

3. By shortening the uterosacral ligaments the cervix is pulled to a higher level in the vagina and is forced to point to the sacral hollow.

4. By shortening the round ligaments the uterus is pulled into a position of anteflexion and the extent of its backward excursion is decreased, these results being the least important of all that are achieved by surgery.

As to what suspension operation should be used, which is the subject around which most of the discussion has raged, it is well to recall the principles laid down by Gilliam and to base one's choice upon them. An effective suspension operation, he declared, should utilize the natural supports of the uterus, should insure a certain amount of mobility, should adapt itself to the functions of pregnancy and parturition, should be permanent in its results, and should be easy of execution. In other words, the ulti-

mate test of an operation of this sort is the permanence of the correction under the stress of life and function, the absence of deleterious effects upon pregnancy and labor, and the maintenance of anatomic conditions in as nearly a normal state as possible.

In the light of these principles certain operations need no consideration at all. Aside from their other obvious defects, operations which involve fixation of the uterus are entirely unphysiologic. The uterus is not a fixed organ. Operations done extraperitoneally through the inguinal ring have lost much of their original popularity. Lusk[6], in 1887, stated that he considered the Alexander operation anatomic nonsense, and Emmet[7], in 1895, said that its principle was wrong and that if it ever gave relief it was by accident. I am not so sure that it deserves quite such harsh strictures. I formerly used the Alexander operation, and I would not go so far as to say that I shall never use it again, but I shall certainly not use it very frequently, for I have seen a good many failures follow its use and some very dangerous situations arise after it, as can arise in any blind procedure.

An operation such as the Baldy-Webster suspension, in which the round ligaments are drawn through artificial openings in the broad ligaments and are attached to each other on the posterior aspect of the uterus, at first glance sounds as attractive as it is ingenious, for the uterus is suspended in the ligaments as if in a sling. Actually, however, it is wrong in principle, for it involves a grave distortion of the pelvic anatomy. The normal relationship of the round to the broad ligaments is completely altered. The procedure, furthermore, is useless if the uterus is heavy or prolapsed, and the very nature of the pathologic process makes it likely to be both. Difficulties are frequent in subsequent pregnancies. Finally, intestinal obstruction has several times been reported after this operation, and probably has gone unreported many times more. The possibilities of this complication seem to have been suspected by Webster himself, for, as Owen and Kelly[8] have recently pointed out, he twice warned of the importance of closing the apertures in the broad ligaments through which herniation of the bowel might, and does, occur. Although sterility is not a usual symptom of retroversion I have seen at least one case in which it was clearly caused by the correction of the malposition by the Baldy-Webster technic. Preoperative salpingography demonstrated the kinking of the tubes, and passage of ureteral catheters after the operation was taken down later proved their patency.

I personally prefer the Simpson modification of the Gilliam suspension operation, which amounts to a subperitoneal transplantation of the round ligaments. This operation maintains the normal pull of the round ligaments, utilizing them in their intended capacity as a suspensory apparatus to limit the backward excursion of the uterus, and the results are almost uniformly good if certain precautions are observed. The suspension must not be performed too low, so that the uterus would be forced toward the abdominal wall, or too high, so that the ligaments would become attenuated from being used in a supportive rather than in a suspensory capacity. The curved forceps used to pick up the round ligaments must at all times be kept within the peritoneal fold of the broad ligaments, so that no hiatus is left through which the bowel might herniate and become obstructed. It is true that immediately after the operation is performed the round ligaments are on tension, but they soon stretch, and pregnancy, as I have repeatedly proved in my own experience, occurs without the slightest difficulty from beginning to end.

SUMMARY AND CONCLUSIONS

1. Backward displacements of the uterus form a confusing subject and their correction is often unsuccessful because the fundamental concept of how the uterus is supported in the pelvis is overlooked.

2. The uterus, which is not a fixed organ, is suspended in the pelvis by the round and broad ligaments, but supported by the pelvic diaphragm (the uterosacral, pubocer-

vical and cardinal ligaments) and the pelvic floor (perineal body).

3. Symptoms do not occur if only the suspensory ligaments are injured, a situation which only occasionally is observed, nor do they usually occur if retroversion alone is present. When, however, the pelvic diaphragm and/or pelvic floor is injured, prolapse is associated with the retroversion, and various symptoms, all of which can be explained by the pathologic process present, are likely to develop.

4. A small group of retroversions is due to congenital defects of development. The larger proportion follow parturition and consist of transient retroversions due to subinvolution and permanent retroversions due to structural damage to the pelvic tissues.

5. Asymptomatic retroversions need no treatment of any kind. Congenital retroversions giving rise to symptoms warrant surgical correction after the cause and effect relationship has been tested by relief following the wearing of a pessary.

6. The incidence of all postpartal retroversions can be decreased by the proper conduct of labor and by the employment of prophylactic measures. Transient retroversions due to subinvolution can be corrected permanently in most cases by the wearing of a pessary until complete involution has occurred. Permanent retroversions due to structural damage and giving rise to symptoms must be corrected by surgical measures.

7. Although several considerations enter into the choice of the procedure for the individual case, the general principle should be that the suspension operation is usually the least important part of the operation and that the retroversion cannot be corrected unless the pelvic diaphragm and pelvic floor are restored at the same time.

8. The suspension operation chosen should maintain normal anatomic relations in the pelvis, permit normal function, and withstand the stress and strain of future life. The Simpson modification of the Gilliam suspension best answers these requirements.

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ARTIFICIAL PNEUMOTHORAX IN GENERAL PRACTICE

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Increasing interest in more active treatment of pulmonary tuberculosis has aroused its share of enthusiasm in general practitioners. Because pneumothorax is rapidly becoming a weapon of the general practitioner's armamentarium we, not as specialists, but as general practitioners, present this paper to outline anticipated problems and their management.

It has been only in the past decade that the practice of pneumothorax has become widespread enough to reach the outlying districts of Louisiana and be made available to the rural patient. This report embraces ten years' experience in pneumothorax therapy in various sections of Louisiana and includes experiences drawn from management of over 100 patients who were given a total of approximately 3500 instillations of air. This statement, however, concludes our statistical analysis, as we consider it superfluous since any such informa-

tion can be easily obtained from the literature on pneumothorax.

The patients in our series came from all walks of life and, as is true of tuberculosis in general, a majority were found in lower economic strata.

Thanks are due the local health boards for reference of numerous of these cases; for excellent cooperation in their management during the course of their collapse therapy, and for educating them to the advantages of therapeutic collapse. The well organized Iberia Parish Tuberculosis Association, through its financial support, made possible in part the treatment given these patients. The Women's Auxiliary of the St. Landry Parish Medical Society is also to be commended for its energetic aid.

SELECTION OF CASES

In handling the problem our selection of cases was made on the following basis: (1) Clinical evidence of active disease; (2) sedimentation indices; (3) verification of the diagnosis of tuberculosis by at least two positive sputa; (4) radiologic demonstration of the lesion.

The usual "acid-fast" staining technic of Ziehl-Neelsen was used in all cases. Blood sedimentation tests were done according to the technic laid down by Cutler, using a plotted 60 minute curve. Too much stress cannot be placed upon this one test by pneumothoracists. Once a lung has begun to contract away from the chest wall, observation of the state of the lesion by physical examination and x-ray is indefinite. For this reason we feel that the sedimentation index is the most important guide to the therapeutic response.

Roentgenography for the most part had to be a home procedure resulting in the use of lines of unequal strength and calling for modifications to meet the existing conditions. In all cases postero-anterior views were taken. Notwithstanding the trying circumstances offered in certain instances, diagnostically legible radiographs were obtained in all cases.

In the earlier part of our experience, selection of patients for collapse therapy depended on the limitation of the lesion to one hemithorax. We did not limit ourselves to either "minimal", "moderate", or "far-advanced" cases. Whether the lesion was deemed pathologically exudative or proliferative was not of great import in influencing the decision to institute collapse therapy. Summarily, unilateral active tuberculosis was our guide to begin artificial pneumothorax.

Following the trend of the aggressive phthisiologic teaching of the past few years, our views towards selection of our cases have become bolder. At the present time we believe minimal or even in some cases, moderate contralateral disease should not deprive the patient a trial of collapse therapy. We have had no occasion to repent this aggressiveness. In some of the cases collapse has been discontinued but in no case has it been because of undue progression of the contralateral lesion. In accordance with the observations of others, our general experience has been that the contralateral lesion has been bettered during the collapse. We are in no position to offer any more of an explanation for this therapeutic parodox than has been advanced by others, but in agreement with the consensus of opinion it does seem likely that a diminution in the toxicity, afforded by control of the more active side, offers the body forces a greater chance of efficiently combatting the remaining lesion.

PROCEDURES FOLLOWED

In evaluating therapeutic response, certain fundamental criteria are considered. First, and of prime importance is the conversion of the sputum from positive to negative, whether or not a cavity is present. If a cavity were present its closure and continued obliteration on reexpansion of the lung was considered a success. Another valuable criterion of the efficacy of treatment is furnished by reviewing serial sedimentation indices taken after the institution of treatment.

Regarding the advisability of a preliminary period of bed rest before beginning collapse, we find ourselves a little more ag-

gressive than average. Our preliminary period of bed rest before collapse is short. Its purpose is more to allow psychic adjustment of the patient to his new found disease and to his medical attendant than to use this period to wait for betterment of the lesion. Too often, we feel sure, this watchful waiting precludes a successful collapse by allowing time for the development of adhesions.

Upon discovery of a new candidate for collapse he is put to bed for two to four weeks, his diet is outlined, and in general he is stabilized mentally by explanations of the purpose of the anticipated pneumothorax. He is told of its chances for successful results on the basis of the average case of his type, the probable duration of treatment, and the likelihood of an earlier social rehabilitation through this method of therapy.

In persons reticent to accept collapses we have even had the prospective patient visited by an ambulatory and economically self-sustaining patient with a maintained collapse. Often this proves a more effective argument than all else we could claim in favor of pneumothorax.

Before beginning collapse therapy we advise our patients to buy a tightly bound composition book in which they learn to keep their own medical record. One section is set aside for recording weight, another contains descriptions of periodic x-ray and fluoroscopic findings as dictated to them by us. The large body of the book is of course given over to the detail of the collapse. Each collapse is dated, the initial reading, the amount of air given and the final reading recorded. In the beginning most patients were prone to make notations of their subjective sensations after each instillation. These often proved of value in helping to determine: (1) the location of adhesions; (2) the rupture of these adhesions; (3) a sufficiency or insufficiency of the amount of air given; (4) development of subcutaneous extravasations; (5) the time of absorption of the air given.

Thus far we have outlined the cases selected for treatment. The routine for administration of air to these patients from the initial instillation constitutes the next phase of this subject. No hard and fast rule can be laid down to fit all cases. A discussion of this problem necessarily divides itself into two groups—time and volume.

As regards time, or the frequency with which instillations are given, here again we can only speak on the basis of averages, for every pleural cavity entered might offer modifications which could not go unheeded. Usually the patient was given initially 100 to 300 c. c. of air and a like amount delivered every second day thereafter until in the course of 10 days' time a total of 1500 c. c. had been given. If during any of these initial episodes it was found that the patient's negative expiratory pressure came down to a +2, the amount of air given each time was decreased, or the period between instillations lengthened to 72 or 96 hours. We have long since observed that optimal pneumothorax results are not obtained by the induction of positive pressures. It is far better to allow normal contractility of the lungs to effect the collapse than to attempt to accomplish this by strong positive pressure. Thereafter instillations are made at increasingly longer periods, until the optimum time for the individual patient is ascertained. After the initial series one or two instillations are usually made at four or five day intervals, an additional two or three at weekly intervals, and then for a period of several months moderate amounts at ten day intervals suffice. There comes a time after this when pleural absorbability of air diminishes and the period between visits can often be stretched to three weeks with the observation that not more than 5 to 10 per cent reexpansion of the lung occurs. In all the foregoing discussion, specific mention is made of the time intervals because we feel that it is to such detail as this that the newcomer is mostly interested. It must be understood though, that this regimen can be upset and demand revision of one's plans by a single reading at the termination of giving air at any one

time, or upon the reading found when the patient returns.

One of us (O. E. D.) uses local analgesia only for the first few visits, thereafter discontinuing its use unless the patient desires it. The matter of analgesia must be settled to the satisfaction of each case.

The second big factor for consideration in the routine for administration of air was an even more variant factor, that concern was regarding the amount of air which a patient should be given each time. It would be easy if initially 100 c. c. of air could be given, at the second instillation 200 c. c., at the third 300 c. c., and so on. Incidentally, scrutiny of past records of some patients discloses that in several cases this plan was unconsciously followed. The big factor that governs the amount of air that a patient can receive at one time is the manometric reading before any air is delivered, after 50, 100, 200, 300, 400 c. c. of air have been instilled. Later on, when the interval between injections has reached 10 days, two weeks, or even three weeks, we come to learn the average requirement of the individual lung and pleural cavity in question. Often the patient himself is a fair judge of the state of collapse of his lung and the amount of air that it needs. One particular patient (who, incidentally, had a bilateral collapse) was forced to come in at weekly intervals instead of his regular three weeks because of the forceful pulmonic gymnastics induced by hayfever suddenly increasing his pleural absorption rate. In connection with the volume of air given, this phase of the subject can be closed with a parting admonition: the first one or two times that air is introduced into a pleural cavity in that patient's chest there is induced a foreign feeling, uncomfortable but rarely painful. It is better these first two times, while the lung is divorcing itself from the chest wall, to give small amounts of air regardless (though we may seem to be contradicting ourselves) of the manometric fluctuation; by so doing we lessen the patient's apprehension and make him forever thereafter more complacent in his attitude to his collapse.

Before we break away from the thought of instituting collapse let us say that in cases of tuberculous pneumonia we begin the procedure within ten days of the subsidence of the acute process, that is, in patients seen initially as a typical bronchopneumonia, once a radiologic and laboratory diagnosis is made, we wait usually only ten days or two weeks before beginning our regular routine. The results attained in every one of these patients argues against a longer period of rest.

BILATERAL COLLAPSE

The evaluation of the possibility of accomplishing a successful bilateral collapse is a most important question. It is somewhat easier to make a decision when a maintained collapse of some duration is followed by a contralateral spread. The length of time that the patient has had the original collapse and the type of collapse that he has largely governs the verdict. One point must be settled in the physician's mind before he seriously contemplates contralateral pneumothorax—the genesis of a new infection. If he can safely feel that the contralateral process is initiated by still present activity of the collapsed side, he should think first of a more positive control of that lesion. On the other hand, if the original lung is deemed controlled, inactive, or possibly arrested, pending the state of the contralateral lesion, decision may be made to institute a new collapse, risking partial reexpansion of the original side if necessary. In cases where one has been so fortunate as to obtain originally a selective pneumothorax or control the active side with a 40 or 50 per cent collapse, it is with comparative safety that the opposite lung may be attacked. It is of prime importance in any bilateral therapy of this type that close attention be paid to vital capacity. In no case where bilateral collapse was contemplated was the idea entertained unless the patient's vital capacity exceeded 2500 c. c. and vital capacity readings were done at each instillation. In cases in which the

vital capacity fell below 2000 c. c. the amount of air delivered was lessened even if optimal readings had to be sacrificed. In six cases handled by us a total reduction of both lung volumes to less than 50 per cent still gave vital capacity readings well above 2000 c. c.

The pneumothoracist in a rural section is frequently called upon to arrest hemorrhage when all other means fail. Hemoptysis of serious amount is the one condition demanding pneumothorax even in the presence of all other contraindications. It is an emergency procedure in some cases, and once the side from which the bleeding ensues is determined, continued voluminous hemorrhage demands immediate collapse of the side. The pathologic state of the opposite side can be disregarded. In these cases it will often be necessary to give large amounts of air. In one patient it was necessary to inject 1200 c. c. before arrest of hemorrhage was affected. The air should be injected 100 c. c. at a time and one to three minutes elapse between each 100 c. c.

PROBLEMS ENCOUNTERED

A problem that will sooner or later confront every pneumothoracist is the choice of anesthetic for his patient in the event a surgical emergency arises. There is no doubt that in competent hands selected inhalation anesthetics can be given safely. If possible, however, it would be better to use some other method. For intra-abdominal work spinal anesthesia has few drawbacks and can be suited to the bulk of surgery urgent enough to submit one's tubercular. In one of our cases with a bilateral collapse, an acute appendix made surgery urgent. The patient refused spinal. Gas anesthesia was considered imprudent. It was agreed that the procedure be attempted under local infiltration of the abdominal wall. The patient's extreme apprehensiveness on the table made it necessary that some additional measure be taken. Pentothal sodium was given intravenously and not only was the appendectomy performed but a uterine suspension done in addition.

Another problem that will sooner or later be encountered is that of pleural effusion. No one group of patients, if properly managed, can present more gratifying results than these. If the diagnosis of tuberculosis is certain, the indications are definite. Should the diagnosis be doubtful one cannot go amiss by treating on the supposition that it is specific. Every pleural effusion necessitating withdrawal of fluid should have a replacement with one-fourth to one-half the amount of air as fluid withdrawn. Especially is it inexcusable to evacuate serous transudates without air replacements. Air replacement is imperative for two reasons: (1) To prevent too abrupt a reversement of the mediastinum to its original position; (2) to insure a future satisfactory collapse. Should emptying be effected without padding the pleural surfaces apart with a column of air it is almost a certainty that fusion of the inflamed surfaces will ensue and troublesome adhesions result.

One case referred to one of us was of tuberculosis of long standing with a progressive downward course. The patient suddenly experienced an acute syndrome which almost proved fatal. He survived, however, and began to improve markedly. He developed gradually a thoracic scoliosis and increasing dyspnea. X-ray revealed a solid left effused hemithorax with apex impulse 2 cm. from right lateral chest wall. At four sittings 7460 c. c. of fluid were removed and 1600 c. c. of air injected into the side. The mediastinal reshift was gradual, the scoliosis improved and the patient continued better, being maintained with a 60 per cent collapse. A case of hemorrhagic pleural effusion was aspirated and the lung kept 25 per cent collapsed and allowed to reexpand gradually until phthisis was definitely ruled out. The diagnosis in this particular case remains to date "idiopathic hemorrhagic pleural effusion."

One point which has not been emphasized thus far is that the handling of these cases was mostly a home and office procedure. We realize how drastic a step it is to institute collapse in an office with only a few

minutes rest after the treatment. Still this was done repeatedly on referred out-of-town patients without a casualty that could be blamed to the informal circumstances.

Adhesions have been quite a common finding to the three of us. We find it remarkable that this was seldom a cause for much concern. Adhesions have not been a cause of failure in any case without cavity, and have not been as deleterious as is usually believed in cases with cavity present. The explanation of this is no dark mystery. Intrapleural air is exerting its pressure-equivalent in every diameter. Lung parenchyma not fused to the thoracic cage will therefore retract first, being least resistant of the tissues in contact with this air. If adhesion is present a cone of lung tissue will be held out while retraction of the remaining free parenchyma continues. Eventually the alveoli throughout the free portions of the lung are emptied and the organ is solid and will compress further only to positive pressures. In the meantime that cone of lung held out by the adhesion has been partially compressed merely by its remaining fixed, while the bulk of the lung has drawn away from it. This elongation itself no doubt constitutes a partial collapse. The remaining part is affected by pressure of the air about the cone. For this reason one can see that the only failures are likely to be those with cavities so stiff-walled that air pressures permissable intrapleurally are inefficient, or those with too dense adhesions of long duration.

As we continue discussion of the excerpts we have made of our experiences, in many cases we have had the exception rather than the rule. For instance, the several untreated women who have become pregnant while under our care have done well. Several recent publications have noted this fact. It was surprising to us, however, to find that in the years following delivery these cases have continued none the worse for their gestation.

The contraindications to collapse therapy constitute a big problem. Extensive bilateral disease is the first; extensive unilateral disease in a person whose physical age is above 45 years or actual age over 50 years. In cases whose lung survey favors a possible successful collapse, organic disease elsewhere of tuberculosus origin is not a contraindication, rather, it will often be found that secondary tubercular disease processes will be bettered by effective collapse.

A complete discussion of any one person's experiences in pneumothorax is impossible to relate short of textbook form. In the following paragraphs brief mention will be made of numerous occurrences of importance.

There is a definite group of patients in whom no pleural space can be found. In these cases manometric readings will either indicate the lodgment of the needle-tip within lung tissues or extrapleural cellular tissue. In the former, regardless of the amount of air injected, the manometric fluctuation will not change, indicating probable entry into a small bronchiole. In such a case the addition of a volatile oil to the fluid in the bottles will be detected on the patient's breath. In the latter case where the needle is lodged in cellular tissue, an increasing positive pressure will be registered and soon subcutaneous emphysema can be felt.

In cases where no reading is obtained on insertion of the needle, a frequent finding at the initial attempt, one or two simple procedures may clarify the situation. It may be the needle is obstructed by a film of fluid clinging meniscus-like to the bevelled opening, or that in its passage through the chest wall, a plug of tissue has blocked the opening. In either case gentle aspiration with a 5 c. c. syringe or pressure on the tubing leading to the chest wall will clear the offending particle; this often serves, in addition, to rule out the entry of the needle into a blood vessel and offset the possibility of delivering air therein.

A summary of our records shows that on the average the new patient with tuberculosis who has come under our care has been returned to his former occupation with certain restrictions within five months; in addition, those patients who have met with

success are not infectious to family or friends within four weeks.

CONCLUSIONS

1. Pneumothorax is a procedure that can be done safely in home or office.
2. The dangers of pneumothorax have been unduly exaggerated in the past.
3. In certain cases (hemoptysis) pneumothorax is as much an emergency procedure as appendectomy.
4. Technical matters concerning pneumothorax have been discussed.
5. An ever increasing percentage of tuberculars are believed today to be amenable to pneumothorax and allied collapse therapy.
6. From a perusal of this article, the newcomer will not be able to begin doing pneumothoraces; it will rather stimulate his interest in the problem and after the preliminary course under close surveillance, guide him through some of the problems that face the pneumothoracist.
7. It has not been our intention to portray pneumothorax as a panacea for tuberculosis. We believe, however, that abetted by surgical collapse such as thoracoplasty, phrenico-exeresis, or oleothorax, it is an indispensable weapon most useful to the general practitioner.

VERTIGO*

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NEW ORLEANS

Vertigo may be defined as a symptom or subjective sensation of disturbed balance. It may occur in various degrees from mild giddiness with momentary loss of balance to a sensation of rotation either of the individual or of objects about him. When the condition is severe it may lead to pulsion or veering of the individual to one side or the other. While vertigo is a cerebral symptom almost all vertigo comes directly or indirectly from the vestibular apparatus. It is one of the most common symptoms that lead a patient to consult a physician and occurs under such varied circumstances that it is often impossible to account for its occurrence and an explanation is purely conjecture.

The maintenance of equilibrium or balance is effected by a complex coordination of nervous impulses coming to and going from the brain. Afferent impulses reach the brain from: (1) the skin, muscle, and joint sense (proprioceptive); (2) visual impressions; and greatest of all, (3) the vestibular apparatus. Efferent impulses go from the brain by way of the pyramidal tracts to the muscles. These impulses are coordinated in the brain.

It is not essential to have all three sources of afferent impulses intact in order to maintain equilibrium, as one may compensate for the other. The loss of two, however, causes loss of balance and vertigo. This explains how the blind man with a normal vestibular apparatus and normal skin, muscle, and joint sense can maintain equilibrium. Loss of either of the two latter mechanisms will cause him incapacitating vertigo and loss of balance. This fact is also well illustrated by the Romberg sign. In tabes dorsalis, the individual is able to compensate for this by using his vestibular apparatus and eyes to maintain balance. When he closes his eyes he is left with just one source of afferent impulses and he loses his balance. A deaf mute without vestibular function may likewise carry on well with his eyes and muscle and joint sense. Sudden loss of any of these functions in the normal man may momentarily cause vertigo but compensation will take place if two systems are left in normal condition.

The first recorded work on the experimental study of the action of the vestibular mechanism was by Flourens who, in 1824, demonstrated that destruction of different semicircular canals of pigeons resulted in turning and falling of the pigeon in different directions. Ewald's experiments in 1892 showed that in the horizontal semicircular canal a current of endolymph toward the ampulla caused a greater stimula-

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tion than when the current was in the opposite direction and that the reverse is true in the vertical canals. To Barany, we are indebted for his observations on the effect of hot and cold water douching of the ear which is now used in the caloric test. His monograph on "The Physiology and Pathology of the Semicircular Canal Apparatus in Man" published in 1907 is a classic.

ANATOMY OF EAR

The anatomy of the vestibular apparatus and some adjacent structures will be demonstrated by a short moving picture. For clinical purposes, it is necessary to know this anatomy in a general way. The internal ear located in the temporal bone is divided into two parts: (1) the cochlea or organ of hearing and (2) the vestibular apparatus or organ of equilibrium. The latter is further divided into semicircular canals, the saccule, and utricle. The semicircular canals receive stimuli when the head is rotated and are so arranged that rotation in any plane affects the endolymph in some one or more canals. The canals are paired so that for each canal there is a canal in the same plane in the opposite ear, however, the ampullae are so arranged that the flow of endolymph is toward one ampulla and away from the other. The canals may be paired as follows: (1) right and left horizontal canals; (2) right anterior vertical canal and left posterior canal; (3) right posterior vertical canal and left anterior vertical canal. The neuro-epithelium of the semicircular canal (crista acustica) is situated in the convex (attached) part of the membranous ampulla appearing as a transverse ridge. The hair-like processes of the neuro-epithelium are covered by a gelatinous substance, the cupola, movement of which causes a stimulation of the nerve endings. This takes place when there is a flow of endolymph within the semicircular canals.

The saccule and utricle detect movement in a straight line vertically and from side to side, respectively. The structure of the maculae acusticae of the saccule and utricle is essentially the same as that of the cristae acusticae except that clusters of minute otoliths are present in the gelatinous substance covering the maculae.

The nerve pathways from the labyrinth to the perception centers have never been proved histologically. It is supposed that a group of fibers go from the horizontal canal to the vestibular nuclei and other groups from the vertical canals to the nuclei. These have connections with cerebellar nuclei which in turn connect with the temporal lobe of the opposite side by way of the superior cerebellar peduncle (brachia conjunctiva). Vertigo perception centers are in the temporal lobes and also parts of the frontal lobes. The vestibular nuclei also have connections with the anterior horn cells of the spinal cord (vestibulo-spinal tract), and with a number of cranial nerve nuclei including the vagus, oculomotor, abducens, trochlear, and spinal accessory. These connections account for some of the automatic responses to vestibular stimulation giving rise to vomiting, nystagmus, or head movements.

CAUSES OF LABYRINTHINE DYSFUNCTION

There are several types of dizziness caused by labyrinthine dysfunction. A. J. Wright of England has classified these as follows: (1) the typical semicircular canal attack in which there is a sensation of rotation of the individual or of objects about him; (2) those with sensation of being forced to one side or the other; (3) attacks in which the patient is suddenly thrown to the ground, either forward or backward, probably due to involvement in the otolith organs; and (4) those with a more or less constant unsteadiness.

Vertigo takes place in such a variety of conditions that it is impossible to describe each here. Almost all cases may be considered to be due to infection in the labyrinth, to chemical or physical activity in the labyrinth (including effusion, the action of toxins, and metabolic processes), or to interference in the coordination of nerve impulses involved in the function of equilibrium.

Acute labyrinthitis, whether suppurative or serous, is one of the most common causes of vertigo encountered by the otologist. It

usually results from acute infection in the middle ear or mastoid by extension of the disease and is a serious complication. The dizziness is of a rotational type with spontaneous nystagmus present. Serous labyrinthitis may take place in any acute infectious disease (mumps) with an effusion into the labyrinth or it may be caused by herpes involving the eighth cranial nerve. These cases caused by acute infection may be confused easily with a toxic irritation of the vestibular nerve in these same diseases. Another condition that may be considered to be a cause of vertigo is a disturbance of metabolism of sodium with effusion into the labyrinth. More of this will be said in connection with Ménière's disease. Syphilis, either congenital or acquired, may lead to labyrinthine involvement. A large percentage (50 per cent) of congenital syphilitics have labryinthine invasion with dizziness, vomiting, and deafness. In acquired syphilis it is unusual but does occur as a late secondary manifestation and leads to destruction of the labryinth in two to three weeks if untreated.

Blocking of the eustachian tube resulting in catarrhal otitis media may produce vertigo. Otitis media or irritation of the drum membrane by foreign substance may also be a cause.

Another group of conditions causing vertigo are diseases affecting the circulation of the labyrinth. Heart disease, kidney disease, arterioclerosis, and anemias may increase or decrease the amount of blood and the blood pressure in the labyrinth giving rise to dizziness. There may be actual hemorrhage in the labyrinth. In this same class we may put anything that would alter circulation or oxygenation of the labyrinth such as asphyxia, gas poisoning or shock.

It has been mentioned that diseases of highly toxic nature often involve the labyrinth and cause dizziness. In somewhat the same way certain drugs like nicotine, quinine, salicylates, and alcohol may cause dizziness. Other drugs such as benzidrine, and adrenalin may indirectly cause vertigo by their effect on the blood pressure. Foci of infection in the sinuses, tonsils, teeth, or any part of the intestinal tract may cause labryinthine irritation.

Conditions having no direct connection with the vestibular apparatus but being the cause of dizziness are certain eye conditions and certain intracranial diseases or tumors. Their production of the symptom of vertigo is usually dependent on either interruption of nerve impulses or production of abnormal stimuli in the system for the maintenance of balance. Eye conditions giving rise to vertigo are usually concerned with imbalance of the extra-ocular muscles. Any condition that causes diploplia or improper or poorly fitted eye glasses may cause dizziness. Intracranial diseases (tumors, abscesses, aneurysms or meningitis) may cause interruption of vertigo pathways or pressure effects. Tumors or abscesses in the posterior fossa near the cerebellum or in the cerebello-pontile angle are more likely to cause vertigo than lesions in other locations. Study of labyrinthine reactions is often helpful in the diagnosis of intracranial lesions (Shuster). Head injuries (concussion) may cause persistent vertigo for a long time after other symptoms have subsided.

A syndrome which has for its chief symptom vertigo has been saved until last as its cause is uncertain. Ménière's disease is characterized by attacks of vertigo, tinnitus and deafness. It comes on suddenly and the vertigo is usually severe. As to etiology, Ménière (1861) first considered the syndrome he described so well, as a labyrinthine hemorrhage; however, this is no longer believed to be true. Mygind and Dederding believe the condition to be due to a disturbance in water metabolism. Furstenberg doubts this and feels that sodium metabolism is at fault. Crowe believes that, although the symptoms of Ménière's disease are due to intralabyrinthine irritation, this irritation is due to a circulatory or chemical disturbance in the endolymph and not to foci of infection in the ear or in other parts of the body. Some say allergy plays a part (Dean) while Dandy believes the lesions to be in the nerve itself and not

the end-organ. It is easy to see that there is little agreement as to the cause of Ménière's syndrome except that some part of the vestibular system including its pathways is involved and the pathology is little known in spite of study of large numbers of cases.

It is necessary to diagnose the cause of vertigo, if possible, in order to treat the condition. Some cases, of course, will fall into the classification of Ménière's syndrome in which the cause is not known.

DIAGNOSIS

The first step in diagnosis is a thorough general physical examination. Particular attention should be paid to the cardiovascular system, including chemical and microscopic study of the blood. The renal system should also be checked as well as a study of the gastrointestinal tract. A thorough search should be made for foci of infection in the tonsils, sinuses, teeth, prostate and gallbladder. Neurologic examination should be made with special attention to signs of cerebral disease. A careful eye examination should be made, including refraction and study of eye muscle balance and the presence or absence of spontaneous nystagmus should be noted.

The ears should then be examined. The presence of foreign bodies or inflammation in the external ear canals should be noted. The middle ear is examined and the patency of the eustachian tube tested. Hearing tests are made preferably with an audiometer to determine the functional state of the hearing apparatus. This is often very important in assigning a diagnosis for a patient suffering with vertigo.

Finally, the vestibular tests are performed and they represent an important step in the diagnosis of the cause of vertigo. There are two times when it may be well to defer these tests: (1) in a case suspected of being an acute suppurative labyrinthitis, and (2) it may be unwise to do a caloric test with a perforated drum when it is the thought that douching with water might do harm to the ear. The vestibular tests most frequently employed are: (1) the rotation tests; (2) the caloric test, and (3) the galvanic test.

The rotation tests are best carried out by using a special rotation chair with head rest and foot rest for the comfort and better position of the patient. For testing the horizontal canals, the patient is seated with his head inclined 30° forward. The patient is now rotated ten times in 20 seconds. Time is noted when the chair is stopped and the duration of the horizontal after nystagmus is noted. The normal duration is 15 to 30 seconds, usually about 24 seconds. During rotation to the right there is a relative flow of endolymph to the left with the endolymph gradually catching up with the turning head. When the rotation is suddenly stopped, the fluid inertia of the endolymph carries it on with a flow in the direction of turning. After turning to the right, then the flow of endolymph would be toward the anterior or ampulla end of the left horizontal canal and away from the right ampulla. Turning to the right therefore causes greater stimulation of the left horizontal canal and is used to test that canal. The slow or vestibular portion of the eye movement is to the right and the quick component is to the left. Nystagmus is named by the direction of its quick component or in this test, there is horizontal nystagmus to the left. Any increase in the duration of the after nystagmus indicates an irritated labyrinth, while a decrease indicates hypo-irritability or the absence of nystagmus indicates a dead horizontal semicircular canal.

The test may be repeated for the right horizontal canal by turning to the left or counter clockwise.

The past-pointing reaction from rotation may be elicited by turning the patient ten times in ten seconds. A normal response is a past-point (illustrated in moving picture) of about 12 inches in the same direction as patient is turned.

The vertical canals may be tested by tilting the head to a position that will put the canals to be tested in as near a horizontal plane as possible (90° forward or 60° back-

ward). This is not as practical as testing the horizontal canals and is not used often.

The caloric test is the simplest and has the advantage of stimulating the labyrinth of one side only. Compared with the cold caloric test, the rotation tests are of little value except for experimental studies. There are several variations of the caloric test but in principle they are all the same, that is, the ear is douched with cold (68° F.) water which causes a flow of endolymph and resultant stimulation of the labyrinth. At this temperature, it takes about 40 seconds for nystagmus to start and when the head is tilted 30° forward the nystagmus is to the opposite side and is rotary in type. If the head is tilted back 60° the reaction remains the same except that the nystagmus becomes horizontal.

The galvanic test is useful in differentiating between a dead labyrinth and an eighth nerve lesion. Stimulation of the nerve may be effected with the electric current even with a dead labyrinth if the nerve is normal.

TREATMENT

The treatment of vertigo may present as many difficulties as the search for the cause. The most effective treatment of vertigo is the removal of the cause if this is possible. There are some cases where the cause may be found as in acute labyrinthitis that may be helped by rest, sedatives, and treatment of the ear condition causing it or it may be necessary sometimes to operate on the labyrinth.

Many treatments for Ménière's disease have been recommended. Horton has had some good results using intravenous injections of histamine 1 mg. in 250 c.c. of physiologic saline solution. This is given slowly and may be repeated the next day if necessary. Histamine is supposed to lessen the permeability of the capillaries so cuts down local edema. Mygind and Dederding restrict fluids and sodium chloride. Furstenberg uses a salt free diet to limit the intake of sodium, and gives large doses (3 gm. with each meal for three days followed by a two day rest) of ammonium chloride to increase the elimination of sodium. These medical treatments may be tried with any case of vertigo where search for the cause has failed.

Surgical treatment of vertigo may be used if medical treatment has failed. Section of the vestibular portion of the eighth nerve as done by Dandy has been very successful and carries almost no mortality in the hands of a competent neurosurgeon. If the hearing is already lost the whole eighth nerve may be severed if desired. Injection of alcohol or formaldehyde into the labyrinth has been recommended by some but section of the vestibular nerve is more satisfactory and perhaps less dangerous.

SUMMARY

1. Vertigo is a very common symptom with many known and unknown causes. The mechanism of its production usually involves the vestibular mechanism directly or indirectly.

2. The essential thing in caring for a patient suffering with vertigo is the establishment of a correct diagnosis.

3. Treatment of vertigo consists of three steps: (1) Remove the cause; (2) medical treatment; (3) surgical treatment, if the others have failed.

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DISCUSSION

Dr. Dean H. Echols (New Orleans): Dr. Walls' paper has been especially interesting because he has not limited himself to one particular variety of vertigo but has surveyed the entire field. The neurosurgeon's interest in vertigo is not as great as many people suspect. Brain tumors in general do not cause dizziness except as a minor symptom. Dizziness is more frequent in severe head injuries, and in people with high blood pressure.

The neurosurgeon is especially interested in Ménière's disease, which Dr. Walls touched on briefly. In this disease, the dizziness comes in attacks. The patient is not dizzy all the time. He may be dizzy only three times a year, but when he has an attack it is worse than an epileptic fit. He falls to the floor, vomits, and perhaps cannot move for an hour. It is an attack of vertigo. The other symptoms of Ménière's disease are progressive deafness in one ear and tinnitus in the same ear. A few years ago the neurosurgeon was tempted to operate on all patients with Ménière's disease. He knew that he could give complete relief by section of the vestibular portion of the eighth nerve. Things have changed since, for with a low salt diet and substitution of potassium chloride for salt we find it is possible to keep some of these patients relatively free from attacks.

Dr. Philip H. Jones, Jr. (New Orleans): Dr. Walls' and Dr. Echols' remarks have been made chiefly with reference to disturbances within the ear mechanism that give rise to this vertigo. That leaves me to make some general remarks concerning dizziness that originates in what may be called systemic disorders. I will have an opportunity here to mention a list of these disorders, and may start by saying that they are physiologic forms of vertigo exemplified by hyperventilation and by the sensation of dizziness that follows unusual positions of the head. Those systemic disorders outside of the ear mechanism which give rise to dizziness are just as numerous and probably more so than the causes of fever. When you are invited to search, therefore, for the cause of dizziness in a patient you have an invitation to proceed along the lines of what may be called the practice of medicine.

For the purpose of brevity, I have grouped them here into: Circulatory, pressure disturbances within the cranium, toxic, nutritional, metabolic, miscellaneous, and—if you will pardon the term,—psychic.

Under circulatory, there is hypertension in which the dizziness is mostly annoying to the patient when the pressure is fluctuating. If the patient gets adjusted to a pressure of 285, he will not complain as much about dizziness as if the pressure fluctuates between 170 and 285. Hypotension such as may be present, essential hypotension, in pneumonias and in congestive heart failure. Circulatory disturbances associated with arteriosclerosis, a condition found frequently in individuals of advanced years with diffuse circulatory degeneration. Stokes-Adams disease, in which the circulation falls for a matter of moments to be resumed again, is frequently initiated by attacks of dizziness .

The essayist and Dr. Echols have already emphasized toxic conditions,—toxic thyroid. Such drugs as the sulfa group. And I put alcohol here for want of a better place to put it. Next to hypertension it is probably the greatest single cause of dizziness. Allergy must go somewhere, and because it is toxic it would belong here, also chemical poisons, such as gases and lead.

Under nutritional come vitamin efficiencies, in which pellagra is probably the most active one. Berberi is uncommon but still causes vertigo.

Metabolic disease—water balance is prominent now as it was not before the vertigo began to be understood as the result of sodium chloride metabolism. The diabetic has attacks of dizziness not explained on any reasonable grounds.

Psychic causes are placed here because the patient will say that he is dizzy. Probably there is no such thing as psychic dizziness.

Dr. E. Garland Walls (in closing): Unfortunately, there are too many cases of dizziness for which we are unable to find the cause.

BLOOD VOLUME IN SOME COMMON CLINICAL CONDITIONS*

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There has been a new wave of interest in the volume of the blood in the last seven years. As is usually the case, this has been due to development of a new method[1, 2, 3] for the determination which has many advantages over older ones. A blue dye is injected intravenously in a subject under basal conditions. Fifteen or 20 minutes are allowed for the dye to mix, then samples are taken every five minutes for 20 or 25 minutes. From these serial samples not only can the concentration of the dye be determined, but also the rate at

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which it is disappearing from the blood stream is apparent, and correction can thus be made for the amount lost during the mixing period. Colorimetry is improved, and allowance can be made for hemolysis in any of the samples. As with other dye methods the plasma is the element measured, and the cell volume is calculated from the ratio of cells to plasma in the hematocrit. Because the general body hematocrit differs from that of venous blood[4, 5, 6] there is an error in the determination of the cell and total volumes. Results are nonetheless quite consistent, for Gibson and Evans were able to predict the volume within plus and minus 15 per cent from their chart.[7]

The blood volume varies in normal individuals with sex, being much larger in males than in females, and also with stature as measured either by the height of the individual or by the surface area.[8] Thin individuals have smaller absolute and larger relative volumes and the opposite is the case with stout people.

There has been no recent comprehensive review of the subject of blood volume but there are a few summaries[9, 10, 11] giving the high points of recent advances. Much of what follows is drawn from the work of Gibson who first applied the method clinically.

HEART DISEASE

In heart disease, there is no change in the blood volume unless failure is present, but when this is the case, the changes are marked. Gibson[12] found slight increase in the blood volume in patients with symptoms of diminished reserve, but without physical signs of failure. In a group with mild failure the increase was greater, about 20 per cent above normal. In severe failure the average increase is substantial, 55 per cent above normal, but there is marked variation from individual to individual. In general the most severely ill patients tend to have higher hematocrit values, that is, the cell volume increase is greater in proportion than the plasma volume increase, but the volume of packed red cells rarely exceeds 52 or 53 volumes per cent. The plasma volume is more labile than the cell volume as seen in patients who grow worse, and also in recovery, for it changes first. As normal is approached by the patient who has been in failure, there is a decrease in the volume of both plasma and cells, the former changing more rapidly at first, but normal levels are not achieved again once failure has occurred. Much speculation about the reason for the change of the blood volume in heart failure has been stimulated, some[13] holding that the increase is due to the increase in the venous pressure, while others[14] believe the increase is the cause of the elevation of the venous pressure as a compensatory phenomenon, but no definite proof of the mechanism involved has appeared to date. It appears that the cell volume increase is closely related to the degree of anoxemia which exists[15] but the wide variation of individual determinations in heart failure as exemplified in Gibson and Evans results and ours remains a challenge.

It once was thought that there exists a group of patients with heart failure of a dry[16] or minus[17] type, in whom the manifestations were similar to those of shock, and in whom the blood volume was supposed to be below normal. Such patients were not found by Gibson and Evans[2] nor by me. Ebert and Stead[5] have recently studied carefully a group of patients, mainly with coronary occlusions, who presented a picture of circulatory collapse, but in these the blood volume was never more than very slightly below normal and they emphasize the concept that these patients suffer from marked diminution of cardiac output, rather than deficient venous return, and do not think the term shock should be applied. It might be said that a cardiac patient suffers during his life from backward failure, most of his difficulties being due to his congestion, his increased venous pressure and edema, but that he dies in forward failure when his heart at last cannot be compensated, and when his state is essentially one of extreme tissue anoxia, as in shock, but not for the same reason.

Because it is not clear whether the increased venous pressure is an advantage

or a disadvantage in congestive heart failure, phlebotomy is not indicated except in cases of acute imbalance between the systemic and the pulmonary circulation with pulmonary edema. In this acute state phlebotomy is at times life saving.

In passing it should be remarked that hypertension without heart failure is not associated with an increase in the circulating blood volume.

THYROID DISORDERS

In diseases of the thyroid gland, variations in the blood volume parallel changes in the basal metabolism.[18] When the metabolism is elevated to about 50 per cent in Graves' disease, the blood volume increase averages 10 per cent high, and in myxedema it is uniformly low, about 15 or 20 per cent below normal when the basal metabolism is minus forty.

NEPHRITIS

The changes observed in the volume of the blood in nephritis[19] appear to vary most closely in relation to the degree of anemia, the degree of hypoproteinemia, and the level of nitrogen retention. Anemia here as elsewhere tends to be associated with increased plasma volume and decreased cell volume. The variation is directly in relation to the serum albumin, as this falls, the volume falls. As the non-protein nitrogen level rises, the volume tends to fall. In general, the blood volume is low in nephritis when the renal function is low.

BLOOD DYSCRASIAS

With the exception of nephritis, anemia in general is attended by the same changes, no matter what the nature of the anemia. Thus, in pernicious anemia, hypochromic anemia, anemia due to chronic blood loss or of unknown etiology, and in the hemolytic familial anemias, in malaria, and in anemia due to drug intoxication, the plasma volume tends to be above, circulating red cell volume greatly below, and total blood volume slightly below normal.[20]

Fortunately, for our routine methods in hematology, there is a very close relation between the actual decrease in circulating red cell volume and the red blood count, the hemoglobin determination and the hematocrit. With effective anti-anemic therapy, the cell volume rises, the plasma volume decreases, and the total blood volume increases slightly. The routine methods of examination reflect these changes accurately. At a level of about ten grams per cent of hemoglobin, or a red count of about three millions, or a hematocrit level of 37 volumes per cent, there is a deficit of about 30 per cent in circulating red cells, and at a level of about six grams of hemoglobin, one and seven-tenths million red cells, or 20 volumes per cent in the hematocrit, there is a deficit of about 60 per cent of normal red cell volume. This is of importance when transfusion is contemplated to tide an anemic individual over an operation or a severe illness, for while a small individual might be helped by a transfusion of five hundred milliliters of blood, a normal sized man with a very severe deficit of cells may need a liter or more to reduce his deficit to the critical level of only 30 per cent deficit.

Polycythemia vera offers a situation essentially opposite to anemia, for these individuals have a cell volume and a total blood volume greatly in excess of normal. Dr. Kaltreider treated one such with a volume of nearly fourteen liters of blood, and even higher volumes are recorded in the literature. The best form of therapy in this situation is repeated phlebotomy,[21] and with this treatment, a gradual decrease in the cell volume is noted. These patients get along fairly free of symptoms when the hematocrit is held near 45 volumes per cent.

PREGNANCY

Normal pregnancy is attended by marked changes in the volume of the blood, there being an increase, especially of the plasma, amounting to nearly 50 per cent, which begins early in pregnancy and is at a maximum during the tenth lunar month.[22] By term, the volume has diminished to a mere 10 per cent increase, and is at a normal level ten days after delivery. Because the plasma volume increases much more than the cell volume, the so-called anemia of

pregnancy is more apparent than real, and little concern should be felt when the red count is over three million, or the hemoglobin more than 10 grams per cent. It is of interest and importance that the incidence of heart failure in pregnancy is highest at a time when the blood volume increase is maximal.

SURGICAL PROCEDURES

Anesthesia and surgical operations are attended by a ten to 20 per cent decrease in the plasma volume, but Gibson[9] calls particular attention to the occasionally much greater losses in the "ether bed" during recovery from the anesthetic, where the loss of fluid by sweating is great, with consequent further diminution in the plasma volume. He emphasizes the importance of fluid therapy at this time. The diminution of plasma volume which occurs during artificial fever induced for therapeutic purposes is from the same cause, increased sweating, and requires similar measures. There is no significant change in the blood volume in fever induced with typhoid vaccine.

SHOCK

Shock is always attended by a diminished efective blood volume. It is not clear what the mechanism is, whether it be loss of fluid into the injured area, into the tissues generally because of increased capillary permeability, or because of the formation of stagnant pools. Plasma is the most effective agent to replace the loss. Shock is one of the situations where the method of determination of blood volume itself is most seriously open to question, because rapid disappearance slopes suggest the dye is leaking out of the blood stream, and this has indeed been found to be the case at times.[23]

CONCLUSIONS

Some of the situations in which determination of blood volume has shed light on disease processes have been briefly summarized. This procedure is primarily of research interest, seldom offering critical diagnostic information, and requiring a fair outlay of time, but most valuable in enabling the physician to visualize what is going on in the patient in heart failure, thyroid disease, nephritis, anemia, polycythemia vera, surgical operations, pregnancy, artificial fever, and shock.

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DISCUSSION

Dr. Edgar Hull (New Orleans): As Dr. Meneely has pointed out, blood volume determinations do not play an important part in practical medicine today, but have advanced our knowledge regarding the pathologic physiology of certain diseases so that we can treat patients more rationally without actually determining blood volumes on individual patients. This is a good example of the contributions to practical medicine which are made by clinical and laboratory experiment.

POSTPARTAL HEMATOMATA OF THE VULVA AND VAGINA*

CASE REPORTS

J. P. MICHAELS, M. D.†
AND
J. S. HERRING, M. D.†
NEW ORLEANS

Two recent cases of postpartal hematomata occurring on our service have served to call our attention to the relative rarity of this condition and the paucity of literature on the subject. We have therefore felt that it would be of interest to report these two cases with a brief discussion of them and of others which have occurred at Charity Hospital.

The incidence of postpartal hematomata of the parturient canal as reported in the literature varies from the figures of Moschkow[1] who reports one in 1,951 deliveries, to those of DeLee[2] who shows an incidence of one in every 7,000 deliveries.

In a study of the obstetric case histories in the Charity Hospital for the past ten years, we were able to discover only eight cases of hematomata in this region in 43,789 deliveries, or an incidence of one per 5,474 cases. That these cases deserve more than passing interest is evidenced by the fact that there were two deaths in these eight cases, both from subperitoneal extension occurring in the suprapelvic variety.

The two cases herein reported were of the immediate type, resulting primarily from trauma at delivery, and both were of the infrapelvic type.

CASE No. 1

A. F., a 20 year old colored female, gravida ii, para i, at no time throughout her gestation had she any manifestations of toxemia. The Wassermann was strongly positive. She was at term and was admitted with a history of ruptured membranes. This fact was confirmed both by bromthymol blue and nitrazine paper chemical tests. A medical induction was given and she promptly went into labor. Some three hours later the cord appeared at the vulva. A vaginal examination was made at once and revealed a single footling presentation with the cervix fully dilated. Under nitrous oxide anesthesia a rapid breech extraction was performed, resulting in a small tear around the lower vaginal tract which was promptly sutured. The baby was in good condition. Some four hours later the patient complained of an unbearable pain in the region of the vagina and vulva. Examination revealed a large swelling, involving both labia majora and the entire perineum. The mass was tense, tender, bluish and slightly fluctuant at this time. A diagnosis of a vulvo-vaginal hematoma was made. At this time it was thought best to temporize and ice packs were used locally. The swelling and pain increased, so it was decided to incise the affected part. Accordingly under nitrous oxide anesthesia a transverse incision was made in the posterior fourchette, and a clot the size of one's fist was removed. Bleeding was minimal, and a few deep U sutures were taken. Five grams of sodium sulfathiazole were then sprinkled into the cavity, followed by tight packing with merthiolate gauze. The pack was re-

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*Read before the Orleans Parish Medical Society, April 13, 1942.

†From the Department of Gynecology and Obstetrics, School of Medicine, Tulane University of Louisiana, and the Charity Hospital of New Orleans.

moved in 24 hours. She remained afebrile and went home on the seventh postpartal day.

CASE No. 2

Mrs. H. B., a 32 year old white female, gravida vi, para iii, was considered to have a moderate toxemia. The Wassermann was negative. She responded well to therapy, and in time was given a medical induction. She spontaneously delivered a viable, seven pound male infant after a labor of ten and a half hours. Bleeding was considered minimal. Several hours later she complained of severe pain in the region of the right side of her vagina and right labia. At this time the right side of the vulva was swollen and exquisitely tender, and it was thought that there was extravasated urine in the urogenital diaphragm from urethral injury. The pain became intensified and the swelling increased in size. The skin over the tumor was glossy, but no bluish discoloration was seen. A vaginal examination revealed a huge hematoma of the lower right vaginal wall. Under a general anesthetic an incision and evacuation of the clot was performed. No bleeding points could be found. However, a small laceration in the region of the posterior fourchette was believed responsible for the hematoma. Several deep mattress sutures were used to obliterate the dead space, and an iodoform pack left in place. Because of a marked chill and rise in temperature the pack was removed that night, and a transfusion was given. The patient made an uneventful recovery and was able to go home on the tenth postpartal day.

DISCUSSION

These cases represent the more usual type of hematomata, in which incision and drainage with ligature of bleeding points seems to be the treatment of choice. It is well to bear in mind that where deaths have occurred the cause has usually been hemorrhage and shock from subperitoneal extension of the hematoma. This would suggest that immediate interference with a complete search for the bleeding points might be of value. In general the treatment may be said to begin with prophylaxsis which would consist of: (1) Adequate treatment of toxemia in view of the apparent close connection between toxemia states and such hematomata as shown by Hamilton[3] and others. In this connection it is possibly a good idea to study the prothrombin time with the administration of vitamin K and also calcium where indicated; (2) careful inspection of the vulva and vaginal tract after delivery for tears and bleeding, with especial attention to the upper angle of lacerations or episiotomies; as this is often overlooked in suturing.

The management of small sized vulva or vaginal hematomata is usually expectant. Ice packs and pressure will usually suffice. The larger variety are best treated as soon as diagnosed by incision and evacuation of the clot, ligation of bleeding points followed by packing. It may be well to call to mind here that one must guard against infection in these cases. Transfusion and supportive measures are used as indicated. The suprapelvic or subperitoneal variety are best treated by combatting shock followed by incision and packing of the hematoma. The vaginal route is occasionally used.

CONCLUSIONS

We have presented two cases of postpartal hematomata of the vulva and vagina with a brief discussion of the incidence and treatment of these and similar cases.

We desire especially to emphasize the possibility of concealed hemorrhage in such instances, and finally to stress the importance of prophylaxis and treatment of these cases.

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DISCUSSION

Dr. E. L. King (New Orleans): There are one or two points worthy of note. One is the rarity of this condition. In spite of the fact that it is rather uncommon—eight out of 40,000 deliveries, as brought out, we possibly might have found more if we had searched the records more intensively or if it had been properly set down on the records so that they could have been cross indexed. However with all due allowance for those factors it still remains a rare condition.

Last year out of 6,400 deliveries, only two cases were reported. There were only two on the ward for that year and I have seen only three or four in private practice and consultations; I do not remember any in my own patients. So you see it is not very common after all.

The chief point about the treatment, as brought out here, is opening widely, finding bleeding

points, and suturing the bottom of the cavity but not too tightly, and possibly leaving a light pack in for a few hours for hemorrhage. The point about not suturing too tightly is this—that we are dealing with vascular and very friable tissue and to get too enthusiastic in suturing more harm than good may be done. Secondly there is the possibility of infection; therefore leave the tissues somewhat widely open. Of course in the past year or so we have been in the habit of putting in sulfa-drugs.

The main points are the question of prompt evacuation and not too tight sutures; use of sulfa-drugs and a light pack for a short time to control the condition.

Dr. J. P. Michaels (In closing): In one case studied where there was failure to close the upper angle of the episiotomy, the autopsy revealed that blood had dissected subperitoneally. An antemortem diagnosis had not been made. It might be well to think of these particular cases when one has a postpartum patient who goes into shock and does not recover readily with transfusions and other measures. This applies particularly to patients where one is fairly certain that he is not dealing with a case of ruptured uterus. Whitridge Williams reported 33 cases in 1922, where the mortality rate was well over 50 per cent. Most of these cases were either late in being diagnosed, or were not discovered until after death.

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THE NEED FOR MEDICAL OFFICERS

The rapid expansion of the Army which ultimately may obtain a size of some five million men, has created a demand which is almost unbelievable for physicians to take care of the sick and injured soldiers. These doctors must be found and must be available for combat troops.

At the recent meeting of the American Medical Association the need for doctors was emphatically stressed by Mr. Paul McNutt of Social Security under whose charge is Procurement and Assignment, and Colonel Love in charge of the personnel in the office of the Surgeon General of the Army. These two men, in addresses delivered before the House of Delegates, indicated that sooner or later, probably sooner, there would be needed 50,000 medical men, or one-third of the total active medical practitioners in this country. The Army forces want, need and must have the younger men. The speakers indicated that if any men under the age of 40 did not volunteer or seek a commission that measures would be taken to see that they did get into the Army. A few of the younger men might be considered as essential to such necessary activities as the continued training of prospective medical men, as being necessary in defense areas and as being essential to a few war industries. These men under 40 will be few and far between. Ultimately it may be that any physically able doctor under the age of 45 would be in the Army.

It behooves relatively young doctors to consider what has been said from authoritative sources. There is no better time than now to enter the Medical Corps of the Army and this should be done promptly. The medical profession has bound itself to secure physicians for the Army and Navy. Procurement and Assignment Service is the child of medicine. It was the idea and concept of the leaders of medicine that the modern physician is sufficiently patriotic to volunteer for the defense of his country. If Procurement and Assignment Service falters and fails then the medical profession in this country will have obtained a black-eye which will take a long while to resume its normal coloration.

Procurement and Assignment has not only to do with obtaining of medical men for the Army but also to provide for civilian needs. The professional man who is left behind must realize and appreciate that even as an older man he has been relatively inactive, he must get back into harness again; those who are now actively engaged in their profession have already begun to appreciate that they must take on added duties, augmented responsibilities and in-

creased work. Not only does the medical profession expect this but the American people are confident that the great profession of medicine will not fall down at this time and during this emergency. The response of doctors to the call to service in this present World War II is in no way comparable to that of the last war. It was said that in the last war three times as many men volunteered, requested and received commissions as in the present war. This is not a heartening response to our country's call. Of course, various reasons have been advanced for this difference between 1917 and 1941-42. Procurement and Assignment is one of the reasons put forth for fewer doctors going into the Army than twenty-five years ago. It is believed that many men feel that Procurement and Assignment will call upon them when needed if they have indicated their desire to serve. Procurement and Assignment service, however, has nothing to do actually with the man getting in the Army. The doctor must of his own volition ask for service and a commission, upon receipt of which he will be ready to serve.

ANALYSIS OF THE PHYSICAL EXAMINATION OF SELECTEES

A report has been issued by the Selective Service system which, in many ways, is extremely interesting not only to the physician but also to the sociologist and psychologist. It is of primary interest, however, to the physician.

This report is a complete summary of the detailed data of nearly 20,000 reports of the physical examination. Of course, it is not statistically significant but it definitely shows trends. The study of these particular carefully analyzed examinations is projected into terms of one million registrants who were not qualified for general military service for physical or educational reasons. By far the largest number were rejected on account of teeth conditions, 188,000 of the 900,000 rejected for physical reasons. The extremely high standards have, since this first registration, been materially lowered and very many fewer men recently have been rejected on account of some one or another abnormality of the teeth. The next highest cause for rejection was the eyes. However, it is comforting to know that 71 per cent of the total could see as well or better than normal and 91 per cent could more than meet the minimal requirements for acceptance in the Army. These minimal requirements will probably be materially changed also. Most of the musculo-skeletal defects which were the next most frequent causes for rejection, are troubles which may be remedied, which rehabilitation will have to be undertaken by civilian physicians. Venereal diseases, mental and nervous defects and hernia accounted for between 56-57,000 rejections each. It is of some interest to know the relative frequency of different types of organic disease, for example 4.4 was the rate per 1000 examined of asthma as contrasted with a rate of 0.6 for bronchiectasis. The rate of far advanced tuberculosis was only 0.05 per 1000 and that of moderately far advanced 1.3 and minimal 0.1. These are most reassuring figures and indicate very definitely the marked advance that has been made in the control and prevention of tuberculosis. On the other hand, mitral heart disease was found in 13.5 per 1000, indicative of the toll that rheumatic fever takes yearly in the younger population. On the contrary, aortic valvular lesions were extremely rare, evidently syphilis had not had time to exert its influence on the heart and aorta of this younger group of examinees. Surprising that hypertension was found in 602 of 20,000 examined, a rate of 30.2, whereas hypotension had a rate of 2.0. One may expect to find dextrocardia, according to this report, in one of every 2000 people examined, and pernicious anemia in one young person in every 20,000. Hodgkin's disease is equally infrequent. Hernia may be anticipated in approximately 38 of every 1000 men examined, whereas nephritis would be found in only 2.7. A varicocele was present in 628 of the 20,000 registrants, whereas peptic ulcer occurred in only 87. Practically no abdominal diseases of any moment except

peptic ulcer were discovered. Acne is a common skin condition. Hemorrhoids are common as are varicose veins. On the other hand, neurologic conditions are very rare but mental deficiencies can be expected in about 11 of every 1000 men between the age of 21 and 35. Mental disorders of various types were found in 362 of nearly 20,000 registrants, giving a rate of 18.2 per 1000.

Of the group of young men in this age period it will be found that their average weight is 150 pounds and average chest measurement will be 33.9 inches, while the average height is 67.5 inches. It states in this report that the acceptance for military service for the country man was 61.9 per cent, while those from urban areas were accepted in 57.6 per cent.

CERVICAL RADICULITIS

One of the pathologic conditions which apparently is definitely on the increase, at least in so far as its recognition is concerned, is root pain as result of hypertrophic osteoarthritis of the spine. The more frequent recognition of this condition than in the past may be explained by two factors, the one being the very much greater frequency with which x-rays are being made at the present time than in the past, and the other that there is a greater incidence of older people in whom this type of arthritis, possibly as an expression of advancing age, is quite common. This so-called peripheral neuritis has been reported extensively and many characteristic symptoms have been described.

Osteoarthritis of the cervical spine, according to Kelly,* may be responsible for many irregular and vague symptoms from pain in the neck to pseudo-angina, to headache, earache and facial neuralgia. Furthermore, the pain may occur in the shoulders and arms and the cause can usually be demonstrated by roentgenography but not invariably.

The sensory symptoms may, of course, vary from extreme degrees of pain to simple paresthesia and a gnawing sensation in the head, neck or arms. There is one characteristic feature which is outstanding in making the diagnosis, namely movements of the spine aggravate the subjective sensations. These movements may of course be varied and of several kinds; raising the head from the pillow, pain on lifting or prolonged sitting may cause distress; jarring in walking or riding may bring on sensory disturbances. It is rather unusual to find limitation of motion in the neck on physical examination but hyperextension of the spine is likely to exaggerate or aggravate the symptoms so that pain, for example, may radiate down the arm when the spine is overextended.

The symptoms of cervical involvement are usually in the lower spinal vertebrae because for one reason the sixth and seventh cervical nerves, although the largest of these cervical nerves have the smallest exits from the spine; then also these cervical vertebrae are not as adequately protected as are the higher ones to repeated minimal trauma. It is obvious why most of the patients will have pain at the tip of the shoulder which is supplied by the fourth cervical, on the outer aspect of the arm supplied by the fifth, and the deltoid muscles supplied by the fifth and sixth. Hence it is obvious according to Kelly, that any one complaining of pain and limitation of motion in the shoulders should have an x-ray made of the cervical spine. Incidentally in Kelly's series of 40 cases, eight of the patients complained of angina pain.

The author employed physiotherapy, gave large doses of salicylates and brewers' yeast tablets daily, together with, in a certain number of cases, x-ray therapy. These therapeutic procedures are apparently beneficial in the management of these patients.

*Kelly, LeM. C.: Chronic hypertrophic osteoarthritis in the cervical spine with radiculitis: A report of 40 cases with a review of the literature, together with some notes on effective methods of treatment, New York State J. M., 42:144, 1942.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

During the month of June the Society held one regular scientific meeting. The program was as follows:

Successful Suture Stab Wound of the Heart—By Dr. Donald B. Williams.

Results of Gastric Resection in a Single Service at Charity Hospital—By Dr. Lawrence H. Strug.

Histaminase in the Treatment of Duodenal Ulcer—By Dr. Gordon McHardy.

NEWS ITEMS

Dr. Howard Mahorner presented a paper on Some Surgical Aspects of Vascular Disease at a meeting of the Mobile County Medical Society in Mobile, May 16.

Dr. C. A. Stewart recently attended meetings of the medical technologists and the State Medical Association of Texas in Houston.

Honorary degrees of doctor of science were conferred by Loyola University to Drs. George J. Taquino and Dr. C. Victor Vignes at commencement exercises held May 18.

Dr. F. L. Jaubert was re-elected president of the Louisiana Society for Crippled Children at the annual meeting of this Society held in New Orleans, May 24.

Drs. Philip J. Bayon, Henry Blum, W. R. Buffington, William B. Clark, Val Fuchs, Mercer G. Lynch, and W. A. Wagner attended a recent meeting of the Louisiana-Mississippi Ophthalmological and Otolaryngological Society in Jackson. Dr. Fuchs was elected president of the Society.

Dr. William B. Clark spoke on Kodacrome Clinic of External Eye Diseases at the annual banquet of Emory Alumni Clinics in Atlanta, June 4.

Dr. William B. Clark was a guest of the American Board of Ophthalmology, which board met in conjunction with the American Medical Association meeting in Atlantic City, June 8-12.

Dr. Isidore Cohn attended a meeting of the American Association for the Surgery of Trauma in Boston, June 4-6.

Dr. Max M. Green recently attended a meeting of the American Urological Association in New York City.

Drs. John H. Musser, Alton E. Ochsner and Wilbur C. Smith were principal speakers at the recent annual senior-faculty dinner of the college of medicine of Tulane university.

Dr. R. C. Voss was elected program chairman of the American Life Medical Section at the convention of this group in Colorado Springs, June 6.

Drs. P. T. Talbot and Julius L. Wilson attended the dedication of the Greenwell Springs Sanitarium, Greenwell Springs, June 3.

EDWIN L. ZANDER, M. D.,
Secretary.

CALENDAR

July 1. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.

July 2. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
Baptist Hospital, Executive Meeting, 8 p. m.

July 6. Orleans Parish Medical Society, Board of Directors, 8 p. m.

July 7. Eye, Ear, Nose and Throat Staff, 8 p. m.

July 8. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.

July 9. New Orleans Hospital Council.

July 13. Orleans Parish Medical Society, Joint Scientific and Second Quarterly Executive Meeting, 8 p. m.

July 15. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Clinico-pathologic Conference, Hotel Dieu, 8:15 p. m.

July 16. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

July 20. Clinico-pathologic Conference, Baptist Hospital, 8 p. m.

July 22. Clinico-pathologic Conference Charity Hospital Morgue Amphitheater, 1:30 p. m.
French Hospital Staff, 8 p. m.
Catholic Physicians' Guild, 8 p. m.

July 23. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
DePaul Sanitarium Staff, 8 p. m.

July 29. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.

July 30. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

July 31. L. S. U. Faculty Club, 8 p. m.
New Orleans Hospital and Dispensary for Women and Children Staff, 8 p. m.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	

FIFTH DISTRICT MEDICAL SOCIETY

The Fifth District Medical Society conducted a special meeting on June 15 for the Procurement and Assisgnment Service at which a large attendance was recorded. Major George R. Benton, U. S. Army Medical Corps, spoke of the urgent need of doctors in the army and announced that Dr. W. A. Rodgers was appointed chairman of the Fifth District Procurement and Assignment Service. The Society, after Major Benton's speech, had a special called meeting and elected six members of a committee to work with Dr. Rodgers as chairman. These are Doctors George Wright, George Snellings, P. W. Calliham, J. P. Davis, C. C. Thompson, and A. J. Reynolds. We have recently lost our secretary, Dr. R. H. Frost, who has been called to active duty with the Navy as a Lieutenant Commander.

W. V. Garnier, M. D.,
President.

SEVENTH DISTRICT MEDICAL SOCIETY

The regular June meeting of the Seventh District Medical Society was called to order at Welsh by Dr. A. H. Forman, presiding. The regular order of the business was dispensed with due to the very long program that was anticipated.

Dr. J. Shirley Sweeney of Dallas, Texas, read a most interesting paper entitled, "Interpretation of Blood Pressure." Dr. Sweeney was then followed by Dr. Paul C. Williams of Dallas, Texas, who gave a paper entitled, "Low Back Pain." He also demonstrated the examination of a back. These papers were highly appreciated by the audience who responded by making both Dr. Sweeney and Dr. Williams honorary members of the Society.

Major George Benton, representing the Surgeon-General's office, then spoke on the Procurement and Assignment Committee, answering numerous questions that were propounded to him by members of the Society and stating quite frankly that all doctors under 45 would be eventually called in service.

Dr. P. T. Talbot, Secretary of the State Medical Society, then talked on "Cooperation of the State and Local Society with the Armed Forces."

Representatives from Opelousas then requested that the next meeting be held in Opelousas.

W. A. K. Seale, M. D.,
Secretary.

EAST BATON ROUGE PARISH MEDICAL SOCIETY

A special meeting of the East Baton Rouge Parish Medical Society was held at the Baton Rouge General Hospital on June 17. Present at this meeting were Major George R. Benton and Captain Joseph H. Fox of the Medical Enlistment Board of the State Procurement and Assignment Service. who brought to the attention of the members present the need of enlistment of physicians and explained the procedure which should be followed in this regard. Much valuable information was furnished and it is felt that the wholehearted cooperation of Louisiana doctors is assured.

Dr. P. T. Talbot, Secretary of the State Society, was also present and stressed the fact that the Louisiana State Medical Society is cooperating one hundred per cent with the Procurement and Assignment Service.

ARMY HOSPITALS ORDERED OUT

The General Hospital Number 24, Tulane University, and Number 64 of Louisiana State University have been ordered into active service as of June 15, 1942. The personnel of the two units is given below:

GENERAL HOSPITAL UNIT No. 24
Lt. Col. Mims Gage, Director of Unit

MEDICINE
Lt. Col. Roy Turner, Head of Division of Medicine

Majors

Archinard, John Joseph
Bayon, Henry Joseph, Jr.
McLester, James Bowron
Watkins, James Harold
Wilen, Carl John

Captains

Dyer, John Lewis
Everett, Peter
Cohen, Stanley
Marks, Hippolyte Peter, Jr.

Matthews, Edward de Saunhac
Vieth, Richard Peter
Welch, John Darrius

Lieutenants

Gordon, Abraham Maury
Joseph, Cheney Cleveland
Miles, Henry Harcourt Waters
Mundt, Leslie K.
Poole, Pierre P.
Snavely, John Robert

SURGERY

Lt. Col. Mims Gage, Head of Divisions of Surgery

Majors

Charbonnet, Louis Sidney, Jr.
Colcock, Bentley Prescott
Cox, Francis James
Ray, Edward Hunt
Rosen, Warren Leucht

Captains

Bayon, Philip Joseph
Boles, William McDonald
Giles, Elbert Jackson
Holcombe, Gordon, Jr.
King, Henry Allen
Lynch, Mercer Genin
Smith, Marvin Colwell
Vincent, Richard Wiltz
Weed, John Conant

Lieutenants

Meade, Robert James
Sabatier, Joseph Adolphe
Silvey, Mortimer
Trout, Philip Cocks

RADIOLOGY

Captain

Fishbein, Harry

ANESTHESIA

Major

Grant, George Bass

PATHOLOGY

Major

Colvin, Samuel Harvey, Jr.

Lieutenant

Weiss, Thomas Edward

DENTISTRY

Major

Rossner, Charles William

Captains

Chambers, Charles Alvin
Diaz, Abram Henry

Lieutenants

Healey, Charles Shepard
Perdue, Ervil Luther
Schwartz, Louis Saul
Wolfe, Frederick Jakob, Jr.

PHARMACOLOGY

Second Lieutenant

Vinci, James Dominic

GENERAL HOSPITAL UNIT No. 64

MEDICAL SECTION

Lieutenant Colonel Ben R. Heninger, Director of Unit and Head of Medical Sections

Majors

Oscar Blitz, Assistant Chief
Charles B. Kennedy
Carlo J. Tripoli
J. O. Weilbaecher, Jr.

Captains

Homer J. Dupuy
Marcel J. Foret
William R. Galbreath
Robert B. Haspel
Murrel H. Kaplan
Harry Meyer

Lieutenants

Edgar P. Breaux
Frederick A. Eigenbrod
William G. Fisher
John E. Garcia
Bernard A. Goldman
Abe Mickal
Robert P. Morrow
Carl H. Rabinowitz

SURGICAL SECTION

Lieutenant Colonel Charles J. Miangolarra, Chief

Majors

Lawrence H. Strug, Assistant Chief
Hugh Ilgenfritz
Henry Reichard Kahle
Robert M. Willoughby

Captains

Irvin Cahen
Rudolph Ellender
Arthur V. Hays
George Haik
Samuel Karlin
William Norman
Gilbert C. Tomskey
Benjamin D. Van Werden
Donald B. Williams

Lieutenants

Samuel Abramson
Claude Craighead
Bernard DeMahy
John L. Kron
George W. Vickery

DENTAL SECTION

Captains

Clyde G. Barthelemy
Francis B. Ducasse

Robert W. Gaston, Jr.
Harold W. Peterson

Lieutenants

John P. Schiro
Harold F. Smith

LABORATORY SECTION

Lieutenants

Charles L. Blumstein
Joe Albert Risser

X-RAY SECTION

Captain

Sam Levi

Lieutenant

Nicholas J. Chetta

MEDICAL ADMINISTRATIVE

Majors

Henry D. Ogden
William Rivenbark

Captains

Adrian Kammeraad
Lawrence Burt
Garland W. Middleton

Lieutenant

Harold Tassin

AMERICAN MEDICAL ASSOCIATION MEETING

The following doctors attended the meeting of the American Medical Association in Atlantic City, June 9-12: W. H. Browning, C. P. Rutledge, W. R. Mathews and George S. Wolfe of Shreveport; O. A. Eaddy, Keithville; M. H. Foster, Pineville; L. W. Martin, Selburg; J. E. Walsworth and J. Q. Graves of Monroe; Ruth G. Aleman, Rufus H. Alldredge, Charles A. Bahn, Robert H. Bayley, Henry N. Blum, W. D. Beacham, W. B. Clark, Stanley Cohen, C. G. Collins, Lily L. Dismuke, Harry Fishbein, G. H. Hauser, R. H. Heeren, Edgar Hull, Harold L. Kearney, W. A. Knolle, Robert C. Lowe, Alton Ochsner, J. H. Musser, H. T. Engelhardt, John Adriani, Donovan C. Browne, W. R. Buffington, Guy A. Caldwell, Sam Hobson, Maurice Lescale, Antonio Mayoral, R. E. Russell, Harry C. Wall, T. A. Watters, Urban Maes, G. R. Meneely, L. J. Menville, S. B. Nadler, W. A. Sodeman, M. A. Spellberg and G. J. Taquino, all of New Orleans.

Dr. T. A. Watters was elected Vice-Chairman of the Section on Nervous and Mental Diseases.

At the American Medical Golf Association, Dr. C. P. Rutledge of Shreveport distinguished himself by winning the prize donated by Dr. B. R. Kirklin of Rochester, Minnesota, to the member in the roentgenologic section making the best net score.

LOUISIANA PHYSICIANS IN THE PHILIPPINES

From latest information obtainable from various sources, it appears that Commander Lea Bennett Sartin, Tulane '13, and Major Edwin S. Kagy, Tulane '34, have been taken prisoners in the Philippines.

Also it has been reported that Dr. William R. Davis, Tulane '34, a civilian doctor with an American sugar plantation at Iloilo, Panay, Philippine Islands, has also been taken by the Japanese.

REED MEMORIAL MEDAL

The Walter Reed Memorial Medal of the Louisiana State Medical Society was presented by the President, Dr. Emmett L. Irwin to Dr. William Riggs Whitehouse, a graduate of the 1942 class of Tulane Medical School, on the occasion of the Ivy Day program on Monday, June 1, 1942.

NEWS ITEMS

The American College of Physical Therapy will hold its 21st Annual Session September 9-12 at the Hotel William Penn, Pittsburg, Pa.

The American Red Cross announces that a new textbook on Red Cross Home Nursing will appear on or about July 1. This book is priced at sixty cents and may be obtained at any Red Cross Chapter.

The National Society for the Prevention of Blindness announces that the Leslie Dana Gold Medal for outstanding achievements in the prevention of blindness and the conservation of vision will be given this year to Lewis H. Carris, Director Emeritus of the National Society for the Prevention of Blindness.

It is interesting to note that the American Red Cross has sent to Russia 1,000,000 tablets of sulfapyridine, 4,000,000 of sulfanilamide, and 1,500,000 of quinine. In addition to these drugs they have sent nearly 3,000,000 pounds of laundry and toilet soap, and 100 tons of surgeon's green soap. In addition to these particular supplies they have also sent an enormously large number of hypodermic needles, surgical gloves, tourniquets, syringes, forceps and other essential supplies.

The National Foundation for Infantile Paralysis has prepared a small booklet on "Kenny's Method of Treatment for Infantile Paralysis." This excellent work of some forty-six pages may be obtained from the Foundation, 120 Broadway, New York.

SOUTHERN PEDIATRIC SEMINAR

The 22nd Annual Session of the Southern Pediatric Seminar will be held at Saluda, North Carolina, July 20-31. A list of distinguished speakers

have been obtained to present the formal talks and lectures, as well as to conduct clinics and round table discussions. Dr. Charles J. Bloom of New Orleans is one of the faculty conducting this seminar.

Dr. Bela Halpert has resigned from Louisiana State University to accept position as Director of Laboratories of the University Hospitals, the University of Oklahoma School of Medicine, Oklahoma City, beginning July first.

UNITED STATES PUBLIC HEALTH SERVICE

Passed Assistant Surgeon Robert L. Zobel has been ordered to Baton Rouge, Louisiana, for duty. Assistant Surgeon James A. Ringer has been relieved from duty in the Marine Hospital of New Orleans and ordered to Coast Guard Training Station in Algiers. Passed Assistant Surgeon Samuel J. Nichamin has been ordered from Washington to the United States Public Health Service District No. 4 in New Orleans.

INFECTIOUS DISEASES IN LOUISIANA

The morbidity report of the Section of Epidemiology of the Louisiana State Board of Health shows that for the week ending May 16 there were listed 399 cases of syphilis, followed by the following diseases in order of frequency in numbers greater than 10: 223 cases of measles, 189 of gonorrhea, 66 of chancroid, 52 of mumps, 29 of pulmonary tuberculosis, 18 of food poisoning, 15 of lobar pneumonia, 14 of chickenpox, and 11 of typhoid fever. The food poisoning outbreak occurred in Iberia and Tangipahoa Parishes, 8 cases for the former parish and 10 in the latter. Two cases of undulant fever were reported in this week, one from Caddo and one from Lafourche Parish. The unusually high incidence of measles, chancroid, gonorrhea, and syphilis is accounted for by the fact that many of these cases were reported from army camps. For the week ending May 23 there were listed 404 cases of syphilis. The epidemic of measles continued with 114 listed for this particular week. Other diseases in numbers greater than 10 included 64 of gonorrhea, 34 of mumps, 36 of whooping cough, 22 of pulmonary tuberculosis, 13 of typhoid fever, and 10 of chickenpox. The typhoid fever cases were scattered throughout the State, no one parish having more than one case except Natchitoches, in which three were discovered. There were several cases of typhus fever also reported this week, and also for the week ending May 30. Other listed diseases for this particular week included 308 cases of syphilis, 155 of gonorrhea, 78 of measles, 30 of pulmonary tuberculosis, 19 of hookworm infestation, and 16 of mumps. A case of poliomyelitis was reported in one of the army camps. The information is not available for the week closing June 6. For that one which came to an end on June 13, there were recorded 294 cases of syphilis, 88 of gonorrhea, 70 of measles, 46 of pulmonary tuberculosis, 21 of mumps, 13 of chancroid, 12 of whooping cough, and 10 of pneumonia. Three cases of poliomyelitis were reported this week, two from Orleans and one from St. Charles. There were listed also four cases of typhoid fever and one of typhus fever. Undulant fever was found in one instance in Acadia Parish. Many of the cases of syphilis and gonorrhea were reported from army camps.

HEALTH OF NEW ORLEANS

The Bureau of the Census, U. S. Department of Commerce, has reported for the week ending May 23 there were 132 deaths in the City of New Orleans, divided 87 white and 45 negro. Ten of the deaths were in children under one year of age, divided equally between the two races. There was a sharp diminution in the number of people dying in the city for the week that closed May 30. Of the 110 deaths in the city this week there were 62 whites and 48 negro deaths, with only five infants dying, three white and two colored. For the week terminating June 6, the figures approached more nearly the three year average than the previous week. In this week the 133 deaths were divided 70 white, 63 negro. Evidently the hot weather was taking its toll of infants, because in this particular week there were four times as many infant deaths as the previous week. These were proportioned 13 white and 17 negro infants. There seemed to be considerable up and down fluctuation in the deaths in the City of New Orleans. For the week which closed June 13 there were 25 less deaths than the previous week, due largely to the small number of negroes who died, there being only 36 in the total of 108 for this week. Six infants in the city died, divided two white and four negro.

DR. ADOLPH NOHA

New Orleans

Dr. Adolph Noha, who practiced in New Orleans for more than fifty years, died at the age of 82 on May 29, 1942.

Dr. Noha originally obtained a degree in pharmacy from Tulane in 1888, and two years later obtained the degree of Doctor of Medicine. He practiced medicine in conjunction with his pharmacy which he sold in 1914 and thereafter devoted his time entirely to medicine. Dr. Noha was active for many years in the Orleans Parish Medical Society and the State Medical Society. In addition to his professional activities, he belonged to many fraternal and business organizations.

DR. ALFRED JACOBY

New Orleans

The many friends of Dr. Alfred Jacoby were greatly distressed to hear of his death very suddenly at the DeSoto Hotel on Saturday, June 13. Dr. Jacoby was well known to the medical profession in the City of New Orleans. He was an active attendant and participant in the Parish Medical Society, and had been a member of the State Society for many years, as well as belonging to the American Medical Association. Dr. Jacoby graduated from Tulane in 1902, and died at the age of 64, after practicing forty years in the City of New Orleans.

DR. HAROLD G. F. EDWARDS

Shreveport

Medical Department of Tulane University of Louisiana, New Orleans, 1911; member of the American Roentgen Ray Society, Radiological Society of North America, Inc., American Radium Society and the American College of Radiology; fellow of the American College of Physicians; member of the American Board of Radiology, Inc.; served during World War I; visiting radiologist, T. E. Schumpert Memorial Sanitarium and the Tri-State Hospital; aged 53; died, May 2 of coronary occlusion.

DR. FLEATOR PALMER

Homer

Born 1885, graduated in 1912 from the University of Tennessee; a member of the Claiborne Parish Medical Society and Louisiana State Medical Society for many years.

BOOK REVIEWS

Clinical and Experimental Investigations of the Genital Functions and Their Hormonal Regulation: By Bernhard Zondek. Baltimore, Williams & Wilkins Co., 1941. Pp. 264. Price $4.50.

The author devotes this monograph to a review of some of his investigations which have been conducted during the past four and a half years, at the Hebrew University in Jerusalem.

In an early chapter he discusses the effects of large protracted doses of estrogens upon the anterior pituitary, namely, the inhibition of secretion into the blood stream of the somatotropic and gonadotropic factors of the anterior lobe of the pituitary. The experimental results of these studies are carefully presented, and of much interest are the effects noted upon the gonads and pituitary in both sexes.

In considering the fate of the sex hormones in the organism, it is pointed out that although the liver inactivates estrone, and the estradiol esters, such is not true in the case of stilbestrol. We may thus account for the relative toxicity of the latter in respect to estrone. In this chapter he reports an unidentified ferment found in potato juice, which inactivates stilbestrol as well as the biological estrogens. Although prolan inactivates were found to be 50 per cent during the first hour after administration, the process and site remained undetermined, but was found not to be in the liver, spleen, or muscle tissue. The time interval between administration and effect of prolan was found to be comparatively great, 24 to 27 hours, and remained the same regardless of the route of injection, i. e., intravenously, intracardially, or intraovarially. The various effects on the follicle differs with the dosage administered, which may be a lead in the direction of the muchly desired knowledge of an "end point," in the administration of gonadotropes.

The clinical investigation of estrogen and progesterone administration during the menstrual cycle, and in cases of primary or secondary amenorrhea, are in accord with the results obtained by several workers in this country.

Studies of the glycogen content of the normal endometrium during the proliferative and secretory phases of the cycle, led to the establishment of a normal value. There was then found an appreciable decrease in this amount in the endometria of 18.4 per cent of the cases of sterility.

In conclusion the author disagrees with those who state that estrogen withdrawal produces uterine bleeding in the form of menstruation. He contends that a new substance is formed in the body from either estrone, or progesterone during the interval between the production and utilization of these products. This transformed substance is responsible for the bleeding.

This volume should be of interest not only to those in the research field, but also to those concerned with teaching, and practicing clinical endocrinology, because of the interesting theoretical discussion and the investigations reported pertaining to many unsolved endocrine problems, as well as the practical value of some of the clinical investigations.

WILLIAM H. BYRNE, M. D.

Diseases of Metabolism; Detailed Methods of Diagnosis and Treatment—A Text for the Practitioner: Edited by Garfield G. Duncan, M. D. Philadelphia, W. B. Saunders Company, 1942. Pp. 985. Illus. pl. Price, $12.00.

Because of the present emphasis on the physiologic, biologic and chemical aspects of disease, the practitioner frequently finds himself in need of a basic review of the "theoretical" reasons for modern diagnosis and treatment. This is especially true for those conditions which have been loosely grouped together under the heading "Diseases of Metabolism."

Any practitioner who wishes such a general review of the usually encountered metabolic diseases will undoubtedly receive considerable help from reading the corresponding chapter in Duncan's "Diseases of Metabolism." For this purpose it is excellent because it bridges the gap between the experimental methods of analysis and the clinical implications.

Since it is always difficult to decide just what abnormal states ought to be considered diseases of metabolism, there may be some criticism of the conditions included within this text. For this reason, there are limited discussions on some disorders of the endocrine system and some of the hematopoietic apparatus. All things considered, however, it should be realized that Doctor Duncan has presented his material to the advantage of the physician. Fortunately, the style of most chapters is appealingly informal so that the reader obtains the impression of a bed-side consultation rather than a didactic presentation.

To anyone wishing to improve his understanding of the fundamentals upon which modern diagnosis and treatment of metabolic disorders are based, this book is heartily recommended.

SYDNEY JACOBS, M. D.

The Principles of Neurological Surgery: By Loyal Davis, M. S., M. D., Ph. D., D. Sc. (Hon.). 2d ed, rev. Philadelphia, Lea and Febiger, 1942. Pp. 503. Price, $7.00.

If one loses sight of the author's object in writing this book, he may at once criticize it for being inadequate. It is not intended to be an exhaustive treatise on neurological problems and surgical procedures which can be used by an experienced surgeon. It is written from the long neglected standpoint of the general practitioner.

Practically every problem of neurosurgery is adequately discussed from the point of view of the practitioner in order that he may obtain a modern conception of the possibilities of neurosurgery and thereby give his patient further advice and aid him in seeking relief. The medical student as well as the general practitioner will find many important and practical points simply discussed in the first chapter, which is concerned with neurological diagnosis. Separate chapters are devoted to craniocerebral injuries, intracranial tumors, abscesses, spinal cord tumors, injuries of the spinal cord, surgical treatment of epileptic seizures, surgical relief of pain, and surgical treatment of essential hypertension.

This book will be a very worthwhile addition to the library of the general practitioner.

GUY L. ODOM, M. D.

Illustrations of Surgical Treatment; Instruments and Appliances: By E. L. Farquharson, Tutor in Clinical Surgery, Edinburgh. Baltimore, Wm. Wood; Williams and Wilkins Co., 1939. Pp. 338, illus. pl. Price, $6.50.

This is a peculiar book. The first twenty pages concern infusions and transfusions, while the rest of the volume is on fractures. In the back are 52 plates with a variety of figures on each, including many instruments of only historical significance. The purpose of such an arrangement is understood only when its author's statement is read, that this volume conforms to the course in minor surgery given by the author.

The illustrations are excellent, as they so often are in fracture books put out by the English. Throughout the text, the versatility and ingenuity of the author are revealed. He shows a sound sense of fracture treatment. The nature of the book, however, is such that it cannot be recommended as a text, while its brevity precludes recommendation as a reference.

DANIEL M. KINGSLEY, M. D.

A Manual of Bandaging, Strapping and Splinting: By Augustus Thorndike, Jr. Philadelphia, Lea and Febiger, 1941. Pp. 144, illus. Price, $1.50.

". . . a neat dressing often bespeaks a good job beneath," states Elliott C. Cutler in a short introduction to this work. "This manual presents in elementary fashion the common types of bandages, strappings, and splints to the inexperienced medical student, pupil nurse, or orderly."

The contents are divided into six parts:

1. The Dry Sterile Dressing for Clean Wounds.
2. Septic Wound Dressing.
3. Sprains, Strains, and Contusions.
4. Dislocations and Emergency Splinting.
5. Transportation of Fractures.
6. The Use of Plaster of Paris and Similar Bandages in Splinting.

The author discusses the material almost entirely by means of pen and ink drawings (117 figures on 144 pages). These drawings were made by two third-year medical students. These are very good as far as they go, showing the more common forms of bandages, strappings, and splints. But for the medical student or interne, they are incomplete. Important details to make clear exactly those stages of procedure where confusion arises are not given. No doubt this manual accomplishes its purpose when used in conjunction with an instructor, as indeed it is used for second year students by its author. However, it does present an excellent nucleus for a future, larger edition.

DANIEL M. KINGSLEY, M. D.

The Clinical Application of the Rorschach Test: By Ruth Bochner, M. A. and Florence Halpern, M. A. New York, Grune & Stratton, 1942. Pp. 220. Price, $3.00.

The increasing recognition of the Rorschach Test as an important adjunct in the study of personality, and the fact that the method of administration and interpretation is very difficult to learn without special training, makes for the ready acceptance of a book which offers aid in mastering the essential technics.

There are, however, no short cuts to learning; and "The Clinical Application of the Rorschach Test" cannot be so considered. The fact that it reads smoothly and easily, that it has an extensive bibliography and interesting case material, does not compensate for the over-simplification of many statements—an over-simplification that renders it unsuitable as a text for beginners. Its greatest omissions are a list of normal detail interpretations, without which the beginner is unable to proceed; and a list of tables of good and poor form answers, which is indispensable to the beginner, endeavoring to differentiate between good and poor form responses.

Those familiar with the Rorschach Method, and able to detect the faults in a book such as this, might find "The Clinical Application of the Rorschach Test" an interesting addition to their library. But its use as a text for beginners should not be considered.

MARION MCKENZIE FONT, M. A.

Body Mechanics in Health and Disease: Goldthwait, Brown, Swain, Kuhns, Kerr, 3d ed. Philadelphia, Lippincott, 1941. Pp. 316, illus. Price, $5.00.

This book is an unusual one. It brings together in one volume the knowledge and experience of a group of Boston orthopedists, as well as the medical background of a well-known internist. The attention of the medical profession is called to a neglected phase of diagnosis and treatment. Starting with a discussion of the anatomical bases, the authors go on to show how disturbances of various organs can result from the pressure effects or interference with their blood supply, following changes from the normal posture and position.

While the orthopedic aspects of this subject have been familiar for years, it has not been generally realized that the organs themselves likewise suffer from the same forces that show up externally in the patient's posture. Case reports of serious conditions such as enlarged and failing hearts and of diabetes mellitus, cured through postural treatment alone, are among the startling features of this volume. A discussion of all the larger organs is given, with case reports of physiological changes that follow poor posture. Dr. Kerr contributes a chapter on the use of the Kerr-Lagen belt for cardiac conditions resulting from postural causes.

While the information presented is thought-provoking, the discussion is often elementary for a medical man, and the illustrations, especially of the x-rays, quite poor. The chapters on treatment also seem to be inadequate.

Nevertheless, the standing and experience of the authors, together with the unusual subject matter presented, combine to make this book a valuable contribution.

DANIEL M. KINGSLEY, M. D.

Textbook of Clinical Parasitology including Laboratory Identification and Technic: By David L. Belding, M. D. New York and London, D. Appleton-Century Co., 1942. Pp. xxi + 90, figs. 27 colored plates I-IV. Price, $8.50.

This volume, which is an outgrowth of the author's planographed *Manual of Human Parasitology* (1933, 1936), is a comprehensive textbook on the animal parasites of the human body. It is divided into seven sections, embracing the following subjects in sequence: I, General Parasitology, including chapters on Parasites and Parasitism, The Pathology of Parasitic Infections, the Immunity of Parasitic Infections, The Transmission of Parasitic Diseases, The Diagnosis of Parasitic Diseases, and The Treatment and Prevention of Parasitic Diseases; II, The Protozoa; III, The Nemathelminthes or Roundworms; IV, The Cestoidea or Tapeworms; V, The Trematoda or Flukes; VI, Arthropoda, and VII, Technical Methods for the Diagnosis and Treatment of Parasitic Infections. The book is abundantly provided with tables, diagrams, line and half-tone illustrations. Both text and illustrations show that the author has painstakingly assembled the best of the contributions made by parasitologists and clinicians in the field of human parasitology.

The author's meticulous care to provide the reader with a full comprehension of the morphology and life cycles of the etiologic agents of parasitic infections has unfortunately not been balanced by critical information and judgment concerning these organisms. This is particularly evident in several of the synoptic figures. Fig. 104 (p. 339), illus-

trating the differences among microfilariae, fails to show *clearly* or *accurately* the anatomical landmarks, especially at the posterior end of the embryos. Fig. 129A (p. 392), referred to as the mature proglottid of the pork tapeworm (*Taenia solium*), omits the accessory ovarian lobule, thus making it diagrammatically that of *T. saginata*. All four of the eggs in Fig. 130 (p. 394) are incorrect representations, but this is especially true of the egg of *Diphyllobothrium latum*, in which the enclosed organism is drawn with the hooklets of a mature hexacanth embryo but lacks the ciliated epithelium, whereas the text immediately above states correctly that "the fully developed embryo is ciliated," and Fig. 137B (p. 406), which also represents the mature egg, is correctly drawn. The synoptic life cycle diagrams in Fig. 164 (p. 465) have borrowed certain illustrations from the reviewer's publication and have interpolated them into positions in which they are misleading. Fig. 239 (p. 686) has borrowed nine of the sixteen unit drawings from the reviewer's illustrations (Fig. 234 in Craig and Faust's Clinical Parasitology, 2nd ed. 1940), without crediting. The map on p. 192 (Fig. 52), is misleading with reference to the geographical distributors of malaria in North America, while those maps showing the distribution in the Western Hemisphere of the lung fluke, *Paragonimus westermani* (p. 489, Fig. 171), as well as Manson's blood fluke (p. 554, Fig. 196), do not reflect critical present-day knowledge.

The use of the term "alexin-fixative test," in place of "complement-fixation test," may possibly be technically accurate but seems strained and pedantic (*vide*, pp. 58, 96, 164, 165, 212, etc.). In considering the "precipitative test" (pp. 56, 806), no distinction is made between specific *precipitin* reactions and the *precipitation* phenomenon resulting from non-specific excess globulin in the blood serum.

In the recommendations for specific treatment of parasitic infections management and contraindications are almost consistently omitted. For example, in the treatment of Gambian trypanosomiasis (pp. 156-157) no mention is made of the need to stop tryparsamide treatment when acute ophthalmic disturbances appear, and in the treatment of hookworm disease (p. 298), ascariasis (p. 324) and fish tapeworm infection (p. 408) there is no reference to the rationale of pre- and post-treatment purgation, both to reduce the toxicity of the treatment and for greater efficiency. While gentian violet is recommended in strongyloidiasis (p. 279) and oxyuriasis (pp. 210-311), the desirable type of coating is not indicated. In the chapter on chemotherapeutics (pp. 820-843) the statement is made (p. 829) that atabrine is "plasmodicidal for all but sexual forms of *P. falciparum*," whereas no drug is known to be specific for the sporozoites or the exoerthrocytic stage of the incubation period.

Cross references are not easy to look up. As one example, on page 97 reference is made to "Sec. VII, XIII, 12." Why not "page 826, topic 12"?

The above-cited examples and many similar ones suggest the author's lack of intimate experience with much of the subject matter. On the other hand, it is evident that he has conscientiously combed the literature for information and has succeeded in producing a creditable text. Moreover it is difficult for the reviewer to criticize this volume, since the author has made such generous use of the reviewer's publications and illustrations.

Belding's Textbook of *Clinical Parasitology* is clearly printed, of pleasing format, remarkably free of typographical errors and is both substantially and handsomely bound. Some of the illustrations are good, others are pleasing to the eye but are inaccurate. Several of the half-tones are worn and do not justify the space allotted to them. The color plates add to the wealth of illustration. The contents of this volume more accurately belong in a "Human Parasitology" than in a "Clinical Parasitology."

ERNEST CARROLL FAUST, Ph. D.

Manual of Pharmacology and its Applications to Therapeutics and Toxicology: By Torald Sollmann, M. D. 6th ed. reset. Philadelphia, W. B. Saunders Co., 1942. Pp. 1298. Price, $8.75.

This new, entirely reset, edition of the time-tested Manual of Pharmacology varies appreciably from the preceding one. The book has been brought up to date in all fields of Pharmocology and Toxicology to an admirable degree. Most of the text has been rewritten and new chapters have been added. Among the chapters that had to be omitted in order to keep the book from becoming unmanageable is the one on specific sera and vaccines, an omission likely to be deplored by many readers. The bibliography (104 pages) consists of publications after 1920 only; for references up to that date the reader is referred to the Fifth Edition.

A book of the dimensions of Sollmann's Manual cannot be reviewed satisfactorily and justly only a few weeks after its publication. Its merits and demerits will manifest themselves clearly only after extensive use rather than superficial reading. Whereas it is not likely to be used much in the undergraduates teaching of pharmacology, its outstanding value as a manual and book for reference seems indisputable. The only weakness this reviewer has been able to note, lies in the organization of the material in some of the less important chapters, as for instance the ones in war gases or on venoms. There are some minor errors and in-

consistencies. The use, for instance, of the metric system alone, or the consistent use of metric system with the apothecaries' system stated in parentheses throughout the book would have been preferable to the often promiscuous use of either system.

GERHARD KATZ, M. D.

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Oxford University Press, New York: Vascular Sclerosis, by Eli Moschcowitz, A. B., M. D. The Sulfonamide Compounds in the Treatment of Infections, by Maurice A. Schnitker, M. D.

The Williams & Wilkins Company, Baltimore: The Medical Applications of the Short Wave Current, by William Bierman, M. D. Urology in War, by Charles Y. Bidgood, Lt. Commdr. (MC) U. S. N. R.

The Commonwealth Fund, New York: The Modern Attack on Tuberculosis, by Henry D. Chadwick, M. D. and Alton S. Pope, M. D.